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MODEL AIRPLANE NEWS

AUGUST 1955 — 35 CENTS

GRUMMAN WILDCAT

WHAT MAKES A CHAMP?

Set your sights on the Nationals—be a champ yourself by following the example of champs. Below are some of the winners of the 1954 Nationals, and what THEY used to win. 27 first place winners used TOP FLITES and POWER PROPS, more than the other 4 makes combined.

Detroit's Rod Pharis took the Junior Stunt Event with his Fox 35 powered Jupiter—a beauty of his own design. He used Power Mist fuel and a **10-5 TOP FLITE prop.**

Winner of the National Stunt Open was Don Still of Beaumont, Texas. His impressive semi-scale Stuka was powered by a Fox 29 engine using O & R Hellzfire fuel. The prop was a **9-6 TOP FLITE.**

The Class ½A Scale Open was taken for the second year by Detroit's Ed Stoll and his beautiful Wasp powered Fairchild. He used Cheminol AA fuel and a **6-3 TOP FLITE prop.**

1st place in the Class B Junior Free Flight event went to David Brownlee of Stone Mountain, Ga. His plane was a K & B 23 powered Spacer using home brew fuel and a **9-4 TOP FLITE prop.**

Bruno Markiewicz of Detroit took 1st place in the PAA Load Class AB Open. His plane was powered by a Torp 19 engine, fueled with Nitro X. The prop was a **9-4 TOP FLITE.**

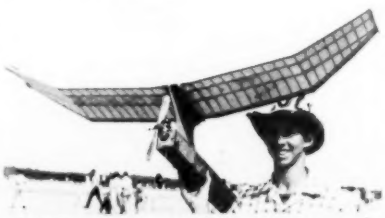
Class ½A Scale Junior Winner Jim Watson of Fort Des Moines, Ia., used Thimble Drome fuel for his Wasp powered F. W. Stosser. His prop was a **6-3 TOP FLITE.**

Jimmie McCrosky of Iredell, Texas, won Flying Scale senior with a sleek F-51, powered by K & B 32 with Power Mist fuel. His prop was a **9-6 TOP FLITE.**

Taking the senior U.S. Navy Carrier event was the faithfully built Grumman AF2-S Guardian flown by Dave Domizi of Rocky River, Ohio. Dave used a Fox 35 engine with Cheminol XL-2, and a **9-7 TOP FLITE prop.**

The helicopter event was won for the second straight year by "Par" Schoenky of Kirkwood, Mo. He used Atwood .049 and O.K. .14 engines with Cheminol AA fuel, **6-3 and 9-4 TOP FLITE props.** At left is TOP FLITE'S Carl Goldberg.

Another Spacer flown by Robert Gelvin of Topeka, Kans., took first in the Free Flight Class A Senior. Bob's K & B Torp 19 engine was fueled with K & B 1000. The prop was a **10-3½ TOP FLITE.**



Both Class B senior and ROW senior were won by Sacramento's Bob Cherny. The Class B Whozet had a K & B 23 engine, using Ohlsson Gold Seal ½A fuel, and a **9-4 TOP FLITE prop.** Bob's ROW winning Lancer used a K & B 15, using the same fuel and an **8-4 TOP FLITE prop.**

Look for This Famous Prop Cabinet at your dealer's.

Get your Free Prop Chart, which tells you what size prop to use in the average engine and airplane combination.

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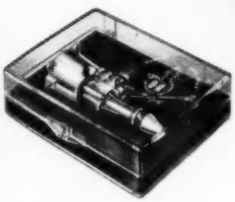

Designed by
HARRY RICE
...the designer who KNOWS engines... from the all-time champion—the O & R .23—to this power-new .049 Midjet with the new V.E. equation (*)!

The engine with Volumetric Efficiency!
OVERSIZE inside—UNDERSIZE outside

THIS .049 engine is a midget in *outside appearance* only.

On the inside there's the new unique "oversize" transfer and exhaust porting designed on a *completely new* turbulence principle. The large feather-valve intakes are also *uniquely* oversized for added power and efficiency.

Here's the engine that was DESIGNED FOR ½A *from the start* . . . the engine wth MORE POWER than any .049 on the market.

Here's the NEW deluxe engine that will give ½A modelers the flight of their lives across the country!

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The Fuel with the Highest Octane Rating in the Model Field! Exactly the correct octane rating to combine with the O & R .049 Midjet and Kwik-Start Glow Plug and deliver maximum power. As with all O & R Fuels, super-octane O & R AA has special detergent added to keep engines clean and smooth running.

Pints 90¢
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NOT just a "short thread Class A plug that fits ½A"... but the FIRST glow plug *originally* designed for ½A operation EXCLUSIVELY. Insulated with a *heatproof, fuel proof* molded insulation that CANNOT LEAK..."Tortured" under severest conditions in exclusive "exhaustion tests."

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27th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

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CONTENTS

CONSTRUCTION

Whirling Wings 9
Breezy 14
Spitfire Stunter 18
Diamond Back 21
Solid Cutlass 26

ARTICLES

These Engines Were Different . 12
For the RC Fan 25

FEATURES

MAN at Work 2
Flash News 7
Hansa Brandenburg 16
Engine Review 20
Radio Control News 24
Trade Show 30
Foreign Notes 32
Pen Pals 45
Contest Calendar 52

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by William Winter

In 25 years of going to contests from Hicksville, N. Y. to Los Angeles, Calif., it has become an ever deepening mystery why people, usually modelers you'd suppose would prefer to join the flying, volunteer for the thankless jobs of timing, recording and directing. Search us! Bosom buddies at other times, timers and judges are as popular as umpires in Brooklyn on contest days. The contest is just something taken for granted by the modelers. It's there and you go to it. Now, having been the radio event director at the 1955 Mirror Flying Fair, MAN at Work knows a little, but only a little, of what goes into one of these meets. Just take RC.

The Mirror Meet was held on May 21. As far back as the preceding December 14, the first meeting of RC people was held. In 1954, the RC event had been almost hopelessly swarmed under. So a small, select group of metropolitan area fliers at this preliminary meeting hashed over problems, possible solutions. Flying at the Mirror Meet goes on from six in the morning until, say, 2:30 p.m., when the flying show takes over. It has got to be that way. For some 150,000 taxpayers visit a major facility to see, besides models, what their air power consists of.

If each of 150 people required 10 minutes' time, you would need almost 24 hours, not 8-1/2, to run off the event. Question: Could the radio event be held? It was decided to limit flight time to seven minutes, including starting the engine. If a man couldn't start within two minutes, he would lose the flight. No delayed flights. Any abort would be an official flight, and you'd have just two of those. No tuning of equipment. You'd have to be ready when you got there.

Impounding transmitters was decided impractical. Why not make everyone remove antennas? This proved out beautifully. No cars on the field. Nothing is worse than a guy who has to set up an auto-based operation. Time, time, time! Why not supply storage batteries? Have generous pit areas—and they still weren't big enough—and restrict the fliers and helpers to them when not flying. A number system was set up. Entrants flew in order of registration. If you didn't show when called, you lost your flight. Only one or two failed to show. You could hold your second flight out, if you wished, but it went at the end of the line when you notified the man at the blackboard. One side of the blackboard took 27 and the other side, (*Continued on page 6*)

NEXT MONTH'S COVER
Curtiss Hawk

PLANE ON THE COVER

Backbone of our aerial fighting force in the early days of the Pacific theater was the Grumman F4F-4 Wildcat with the 1,200 hp P&W Twin Wasp engine. Wildcats fought off North Africa; many also were bought by the British, as this invasion-striped painting by cover artist Jo Kotula reveals. It is called the Martlet.

OK CUB .049A

NEW! POWERFUL! COMPLETE!

Brand New Design!

. . . special for control line flying. Lightweight, oversize fuel tank gives you winning range and power, plus greater output on a power/weight ratio. Mounts flush on the face of your plane. Comes complete with prop, spinner and super-capacity fuel tank. **$4.95**

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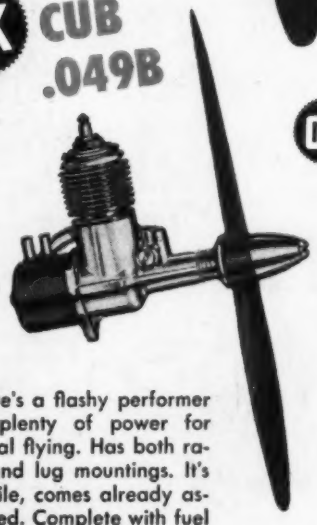

Here's a flashy performer with plenty of power for general flying. Has both radial and lug mountings. It's versatile, comes already assembled. Complete with fuel tank, prop and spinner.

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KNOW your engine . . . assemble it yourself! Learn your engine from the inside out . . . and save $1.00! Includes all the parts and complete instruction for assembling the Cub. 049B.

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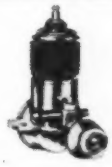
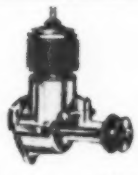


"OK" CUB .099
$6.95



"OK" CUB .14 **$7.95**
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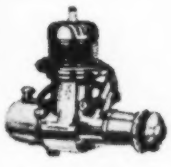

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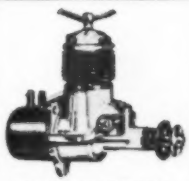
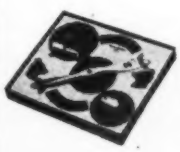


"OK" CUB DIESELS
.049 **$5.95**
.075 **7.50**



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CUB .099..... **7.75**

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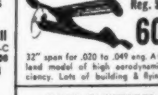

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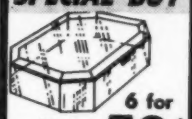

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MAN at Work

(*Continued from page 2*)

other frequencies. Maybe eight out of well over 100 people actually flew on other frequencies so, as it proved out, numbers of judges were not the answer; you can still fly only one 27 job at a time. Everyone had to show station licenses, etc. Duplicate flight plans, rules, and diagrams of pattern were mailed to registrants in advance. Three-quarters were ready to fly within minutes of arriving at the meet.

On the big day, the runway just was cleared by six. Contestants arrive, want to fly, before a table or chair is set up. But things hum along. Then you hear the storage batteries are dead—although they were charged the day before. Tests show that it is not the batteries, but a very few transmitter types susceptible to tuning changes when moved from car to ground, or to concrete runway under which there is a steel mat. But there is only one spectacular flyaway all day and that wasn't caused by transmitter failure. Somebody gave you 1/100 second speed stop watches by mistake. When the judges see the hands whirling around, they cry broken watches. Anyway, you can't watch radio jobs, make notes and keep track of half minutes on a fast watch. So you borrow watches. People drift into pit areas, onto runways, and it takes the help of police to keep rolling. Anyone without a number or helper sign is banished. So the Navy tries to put the poor director behind the ropes. Contestant 24, that's us, for the afternoon. People want to chase planes into a restricted area. A tough guy feuds with a gob. His batteries are running down and the heck with everyone. So a jeep retrieving system is set up. Problems? Two guys from a distant city arrive at 9:15, 15 minutes after deadline. They'd been fouled up on field itself for 45 minutes. Can we take them? No. For who knows how many others have been turned down, or how far they came? Everybody knew the problems well in advance and there are people from many distant states already flying. One judge says another contestant is a cop: what do I do? He's had over two minutes to start and that's all. Another guy, told his two minutes were up, cried, while helpers chorused in unison, "But we been up since 5:30." Touching. Broken hearts litter the runway. George Swank, Hank deBolt, helping, come out and George's two-year-old glow plug acts up. Two minutes, like all the rest. But everyone who registered got to fly, all but six of them twice.

Multiply this sort of thing by Carrier, Stunt, Free Flight, Payload, and so on, and you'll get a wee indication of what is involved in a big contest. That four-day Nationals was rough? How would you like an eight-hour Nationals? Yet, apparently, the Mirror's Ted Clodius thrives on this stuff. He runs a half dozen other major promotions a year. The previous one had to do with twins. They had 119,000 (that is correct) sets of twins entered and it took 24 girls weeks to handle the paper work. You can't keep out from underfoot when you get mixed up with this guy. The one big thing to remember is that judges, etc., are modelers like ourselves, not professional, or even trained judges, any more than you would be if the roles were reversed. So think twice when you consider giving any judge his lumps.

• • •

▸ The day after the Meet, deBolt, Swank, Frank Schmidt and others joined our Sunday flying session. Frank may have been a modeler before some of us—or our fathers—were born but, brother, he put a Cruiser through its paces. (He flew rubber job off the barn in 1910.) Inverted flight, steering right and left, with a flat bottomed wing. The flight we got the kick out of was the one where only four rubber bands were on the wings. Eyes

(*Continued on page 45*)

Flash News

Many developments push back the air frontier -- this monthly report will keep you in the know.

By JOHN F. RUDY

Aviation is at the door of a "you ain't seen nothin' yet" stage. That's an inescapable conclusion, once you've studied all the forecasts, the upcoming technical developments, the private talk among scientists. Air transport, by 1960, will be handling 25-billion passenger miles yearly; about two-thirds of the four million Americans going abroad will go by plane; a whole new airport program will be needed for the jet age; business flying has dynamic expansion ahead: the 8,000 firms now using 21,500 planes will rise to 22,000 businesses and 30,000 craft.

The helicopter may well steal the spotlight for a while. A fabulous travel market lies ahead for it. CAA, for example, fully expects many of the 133-million people who will travel intercity from 150 to 700 miles ten years hence will be using the 'copter. It also foresees some 286 daily 'copter movements between just New York and Washington, 1.5-million carried yearly.

Eleven whirlybird models are now certificated; new and bigger ones are coming along rapidly. Among the latter is a Cessna with a supercharged engine for high-altitude operation, a Hiller with ramjets on blade tips to eliminate weight and maintenance of a transmission, even twin-engine and turbine-powered craft.

Bell Aircraft tells us some of the amazing uses the 'copter is being put to: as insecticide bombers to wipe out Africa's tsetse fly; helping bring Japan's insect, fungus and plant diseases under control; study and report on Suez Canal's shifting sands; replacing the St. Bernard (but not the little barrel of cold medicine) in the Swiss Alps; carrying lady bugs in a hurry in Southern California. Other uses include helping Japanese whalers get their biggest Antarctic catch in 18 years; doing the equivalent of five years of surveying in Canada for Alcoa in 20 flight hours; seeding 1,200 acres in less than three hours.

The 'copter statisticians have it all figured out that a trip of 200 miles with a craft of 100 mph will give faster downtown-to-downtown service than an airplane at 170 mph, counting ground time at terminals of five minutes for 'copters, 30 minutes for the plane. On the basis of elapsed time the 'copter shows up at 89.6 mph; the plane, at 86.3 mph.

Canadian Pacific Air Lines, Ltd., plans to use the new Comet 4 (at $2.8-million each) on its transpolar Vancouver-to-Amsterdam service by 1960. The 4,825-mile flight will mean that a westbound Comet leaving Amsterdam at noon will arrive in Vancouver at 2 p.m. local time as it cuts eight hours from the DC-6B's 18-hour flight time.

Planes operated by rocket engines are not too far off. De Havilland is testing such an engine -- the Spectre, a liquid propellant job specially designed for interceptors that can fly in rarefied atmosphere beyond that of conventional air-breathing engines. Armstrong-Siddeley also has a new rocket-type engine, the Snarler, successor to the Screamer.

A muffler to cut jet noises is no longer far-fetched. United Aircraft has one in model stage -- extends over the tail pipe for take-off when noise makes ear drums suffer most. After take-off it retracts like a collapsible drinking cup. It works on the principle that narrowing the nozzle of an exhaust tube raises the pitch of noise so high it can be hardly heard.

Space ships 22,000 miles out from earth! Solar heat to drive such a ship's electrostatic powerplant! Interplanetary travel from an earth satellite! Fantastic sounding is a good description. But they do not come from the fictioneers, but from a recent top-level scientific meeting.

Commuter rockets would probably carry fuel to earth satellites. But this presents tough problems since 170 lb. of fuel would be needed for every pound of payload. Such a rocket ship to Mars would take 1,100 tons of weight. But an electrically-propelled job--with 10 persons, 50-ton payload -- would come to only 250 tons. Flight time--roughly one year. A two-year flight, 780-million miles, would require 7,500 tons for a rocket space ship but only 275 tons for the electrically-propelled ship.

A Mouse in the sky is not theory. The word denotes Minimum Orbital Unmanned Satellite of the Earth. These are the first space vehicles that would be placed at around 1,000 miles altitude. They would measure the earth's reflective power which helps determine our weather conditions. (cont. on page 43)

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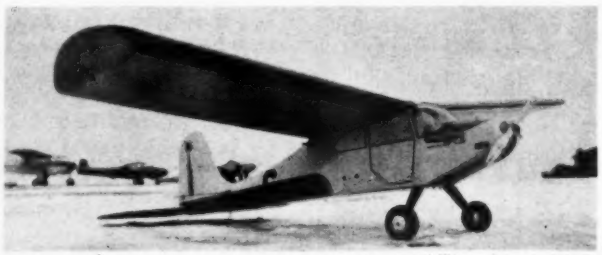

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PENETRATION...
The force arrangement is such that it provides exceptional wind penetration without excessive power. Climb is controlled under all flight conditions and speeds.

STABILITY...
All design factors are aimed to provide exceptional stability and immediate recovery from abnormal positions without sacrificing maneuverability.

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The extensive use of prefabricated sheet balsa makes for a simple to assemble model with extreme strength which gives many trouble free flights.

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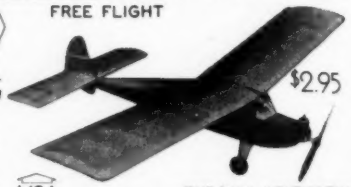
Live Wire kits are complete kits for building the model. All materials are unconditionally guaranteed to be the finest, instructions cover building, radio installation and flying, plans are complete and full size.

FREE FLIGHT



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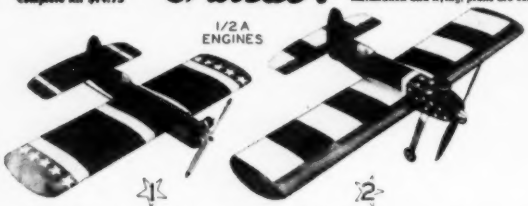

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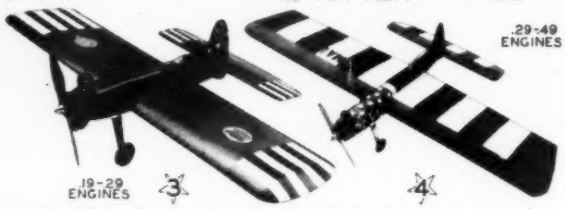
.19-.29 ENGINES



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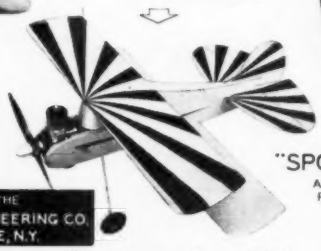

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10 YEARS OF PROGRESS BUILT INTO ONE DESIGN!

Close-up of author's Sikorsky XH-5 shows those all-important details of the engine and rotor hub.

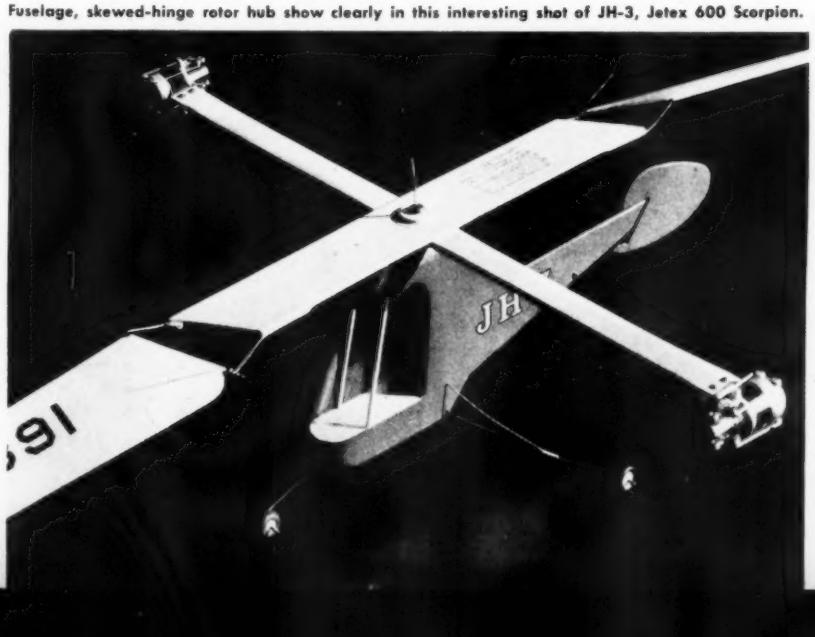
Whirling Wings

By PARNELL SCHOENKY

A great exponent of radical aircraft, especially helicopters, the author here sums up results of many hundreds of flight tests.

▼

Fuselage, skewed-hinge rotor hub show clearly in this interesting shot of JH-3, Jetex 600 Scorpion.



▶ Now that the Hiller Event for realistic, maneuverable model helicopters has been established and kits for power and Jetex helicopters are available in every model shop, interest in these ever-fascinating whirlybirds is taking a more active turn. From the number of questions put to us, it would seem that not all of those interested have been able to build successful helicopters. Of course, some fellows succeed right from the start, but enough do not convince us that additional rotary-wing know-how is a definite need.

Perhaps some fresh light on the subject would also prove encouraging to the rather large group of modelers who have never attempted to build a 'copter because they feel that this type is just too complicated, too loaded with hard-to-make parts for anyone but an "expert" to cope with. On the other hand, some of the difficulties which helicopter builders have run into probably stem from over-simplification of the stability and efficiency aspects of such models. What we shall endeavor to get across is that model helicopters are not really difficult, but that they are quite different from ordinary models in the manner in which they obtain lift and provide for stability and control.

All of us are so familiar with our conventional models that we seldom if ever reflect on the fact that it took centuries for men of genius to bring forth such principles as make possible even the ultra-simple little rubber-powered tractor: the separate stabilizer, negatively inclined, for longitudinal stability; the cambered, dihedraled, high aspect ratio wing; the twisted rubber as a source of power, and the thin-bladed airscrew for converting rubber energy to thrust. To understand the workings of the helicopter, a somewhat more complex flying machine, we shall have to learn the functions of each of its major parts and then discover how they operate in combination. The sea is unforgiving, and the sea of air is doubly so. We cannot blithely assume, as many do, that stability is no problem in 'copter design, simply because every model has a big fuselage hanging below the source of lift like a pendulum. When flight tests begin, the need for

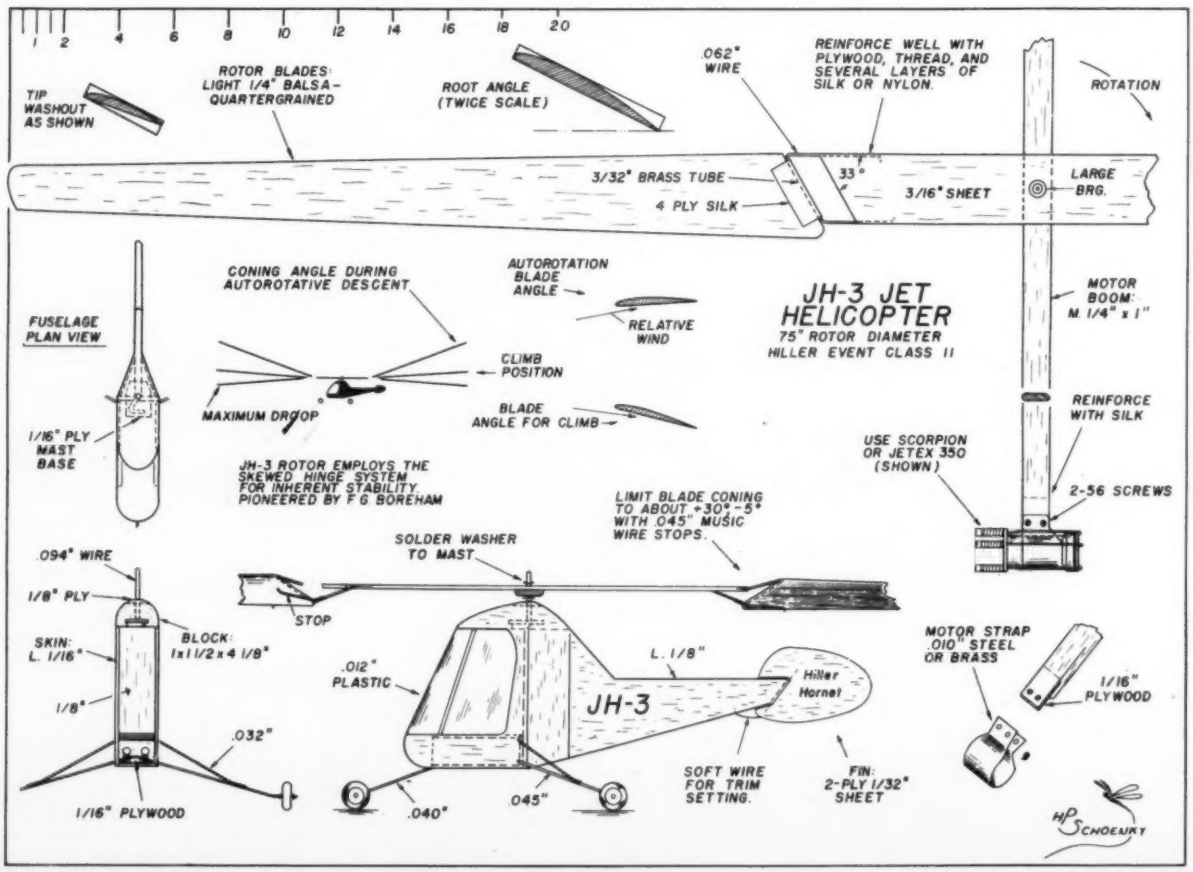
Despite 150 rpm rotor, camera has "stopped" blades at moment of releasing XH-5 for take-off.

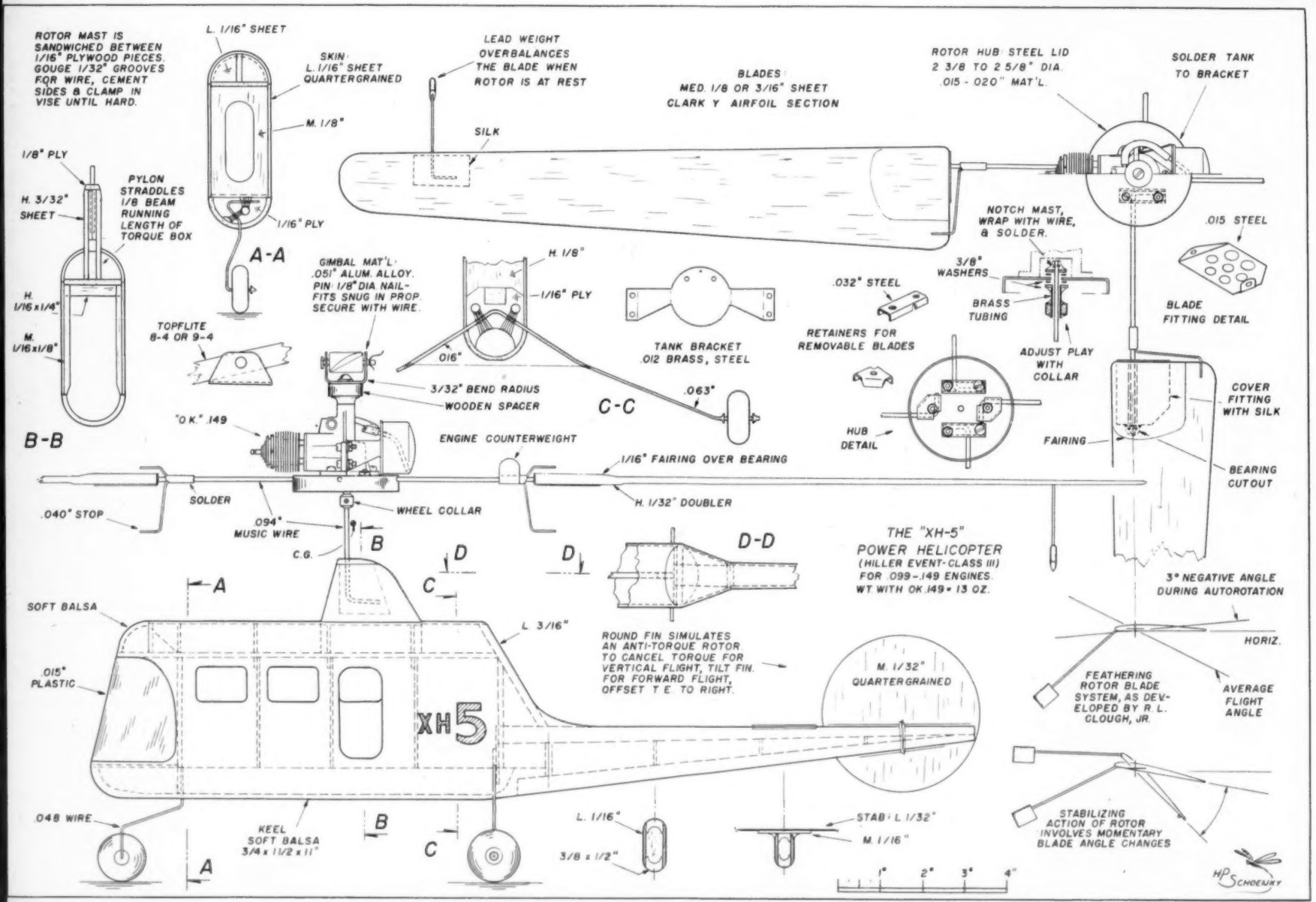
Gassing up Cub .14 XH-5, author does not fill the tank because of high rate of climb of craft.

Blades of jet 'copter rev faster than gas-powered jobs, yet give gentle autorotative descent.

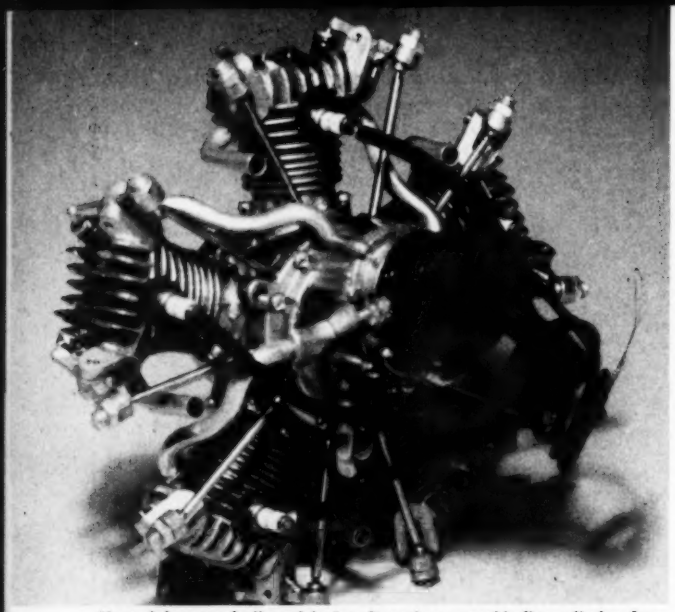
positive provisions for inherent dynamic stability is soon brought home to the errant builder. That is, if he hasn't gone astray with regard to the other primary requisite of rotary-wing craft—i.e., efficiency—and failed to get his eggbeater airborne in the first place.

Let us deal with this matter of efficiency first of all, for a good understanding of it will do more to put your helicopter into the air than thousands of words on gyroscopes, momentum, and associated theories. (Before we go too far, perhaps it should be noted that space is limited and therefore we won't be able to give detailed explanations for every statement offered.) To begin with, the power helicopter model is considerably less efficient than the average free flight model. For a rough comparison, you can assume that a Class A engine capable of powering a hefty RC ship will only lift a third as much weight when installed on a helicopter. Light construction obviously becomes a must, and this boils down to such practices as the use of light quarter-grained sheet wood for bulkheads, skin, and rotor blades, light wheels, use of the proper gauge wire and metal for fittings, and a minimum of soldered joints. Helicopters require a first rate powerplant, and not simply anything one happens to have in stock. Select your radial-mount engine, either glow-plug or Diesel, for its power-to-weight ratio and not for its torque rating. The average torque-reaction helicopter obtains more lift from its small propeller than from its large rotor. For this (*Continued on page* 37)

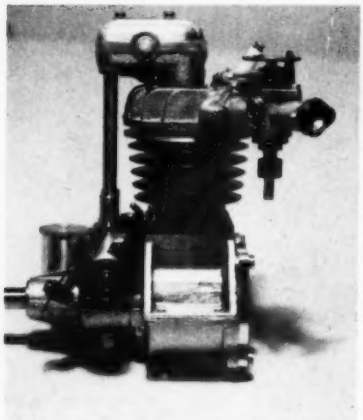


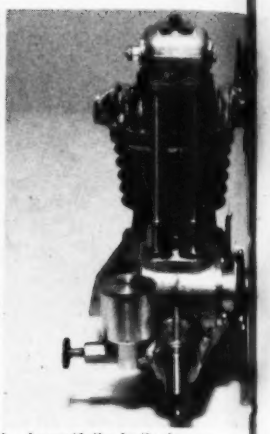


FULL SIZE PLANS AVAILABLE. SEE PAGE 50.



Most elaborate of all model aircraft engines was this five-cylinder, four-cycle Burgess M.5, scaled after the 85 hp LeBlond aircraft engine.





Gone the way of so many good things is the beautifully built Jensen C.I. .60, overhead valve, four-cycle engine. Was acclaimed by all.

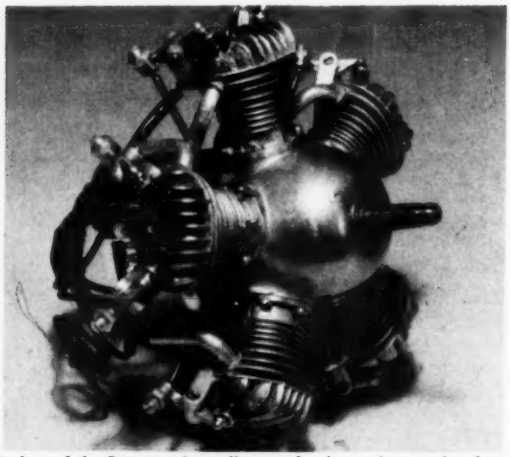
These Engines Were DIFFERENT

By P. G. F. CHINN

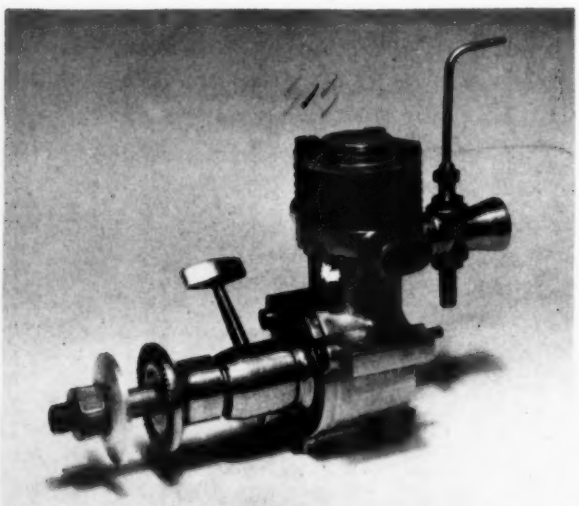
How would you like to have a display case of engines like these? No freaks; all saw production.

▶ Our articles dealing with various lesser-known — mostly foreign-built — motors invariably result in many inquiries from readers anxious to obtain examples of these engines. Before we go on to describe the selection of models which we have assembled under the heading of "unusual" motors, therefore, it must be mentioned that most of these engines — mainly multi-cylinder and four-cycle types — are no longer made.

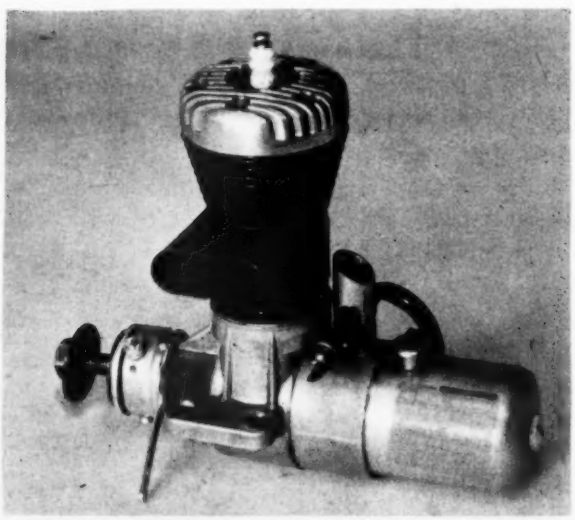
Quite the most remarkable production model aircraft engine of all time, we think, was the Burgess M.5. This true-scale



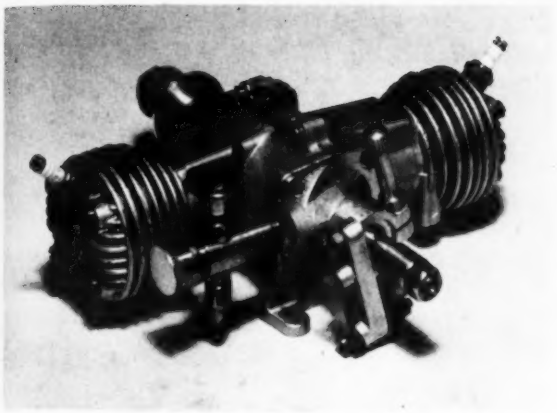
Front view of the Burgess gives glimpse of valve springs and rocker arm assemblies. Displacement was .92. Did fly ukie scale but not powerful.



Early type Norwegian D-A Diesel had eccentric crankshaft bearing, a fixed head. Rotating the lever raised or lowered parts to adjust ignition.



Contestor D.60R of 1947 had drum type rotary valve, rear intake. Similar system afterward used on Fox stunt .59. Ignition still tops in '47.



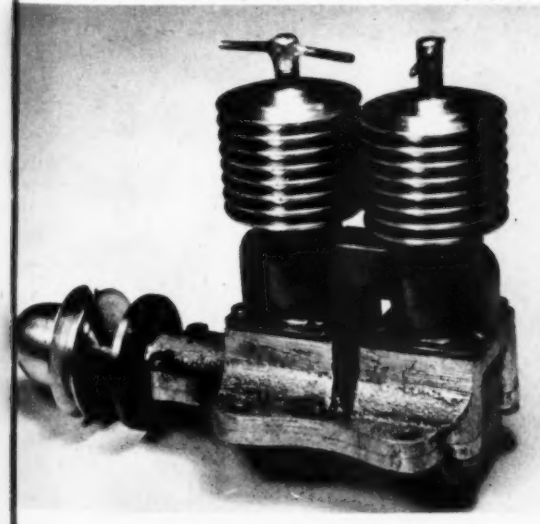
Craftsman-Twin, British .607 simultaneous firing job with rotary disc induction. Interesting design but unfortunately it was lacking in power.

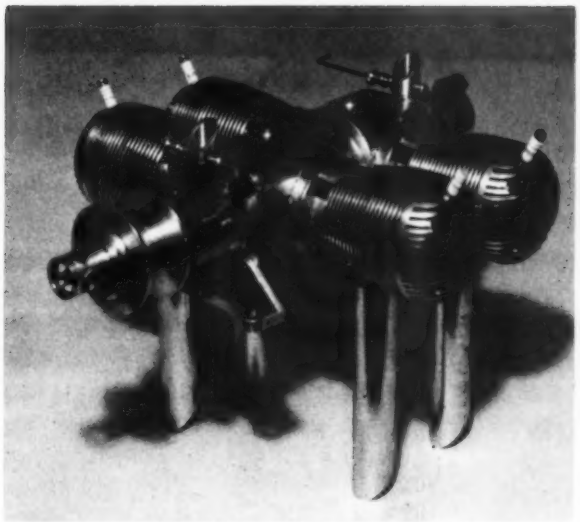
type model aero engine is unlikely to have been forgotten by anyone whose model building experience extends back over the past decade, but more recently recruited enthusiasts will understand our placing it No. 1 in order of interest when it is pointed out that this was not merely a multi-cylinder motor but was also a real radial, with five cylinders, and was of the four-cycle type with pushrod-operated overhead valves.

The M-5 first appeared immediately after the war, when it was known as the Morton M.5. It was built in Nebraska by Morton Bros., whom pre-war modelers will remember as producers of the Morton Challenger, a moderately priced rotary-valve gas motor of specification somewhat similar to the Baby Cyclone. Then the Handicrafts Division of the Burgess Battery Co. at Lake Zurich, Ill., took over the manufacture and the motor was renamed Burgess M.5. We are not certain exactly how long the M.5 remained in production, but it does not seem to have been available much beyond the end of 1948. (Editor's Note: *In early 1950, M-S Engineering Co., Libertyville, Ill., took over the Burgess and, at that time, had planned production.)*

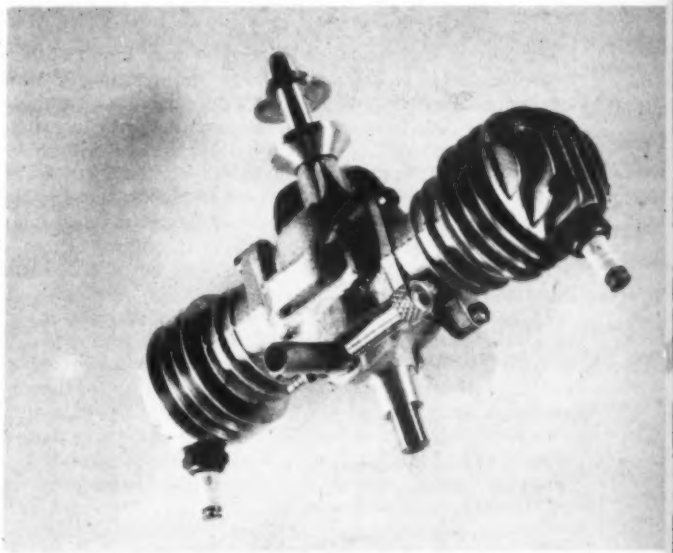
The M.5 had a displacement of .92 cu. in., the bore and stroke being .625 in. by .600 in. It had an over-all diameter of 5-3/8 in. and weighed 22 oz. bare. Normal method of mounting was by means of a 3 oz., 5-1/2 in. dia. diecast ring-mount which was screwed to tapped (*Continued on page* 39)

K & B Allyn twins have created much interest. This is a new British twin, the .29 alternate firing Taplin Diesel. Turns 13 in. prop, 5,500, RC.



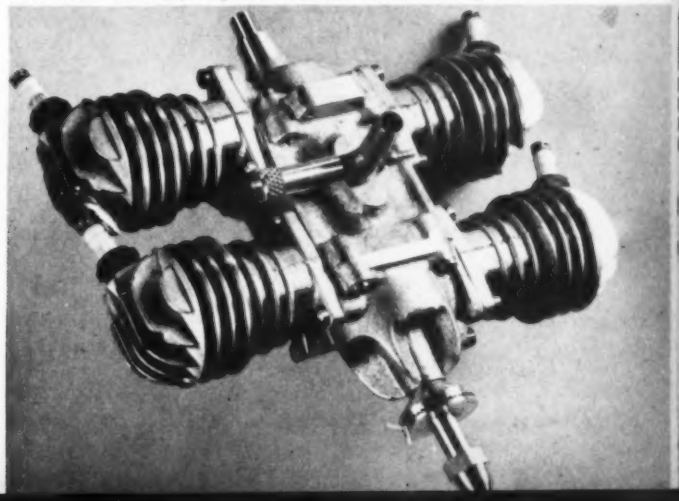


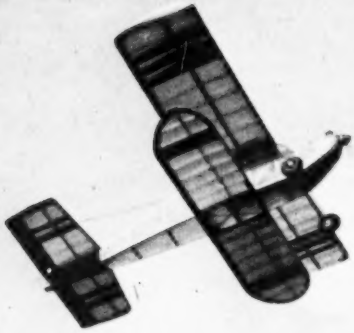
MAN's own Ted Martin designed this Amco with four cylinders of .60 displacement each with four sets of points. Intended as drone powerplant.



Famous for many years (still made) are the various Elf engines, twos, fours and even sizes. Parts are balanced for smooth running; good for RC.

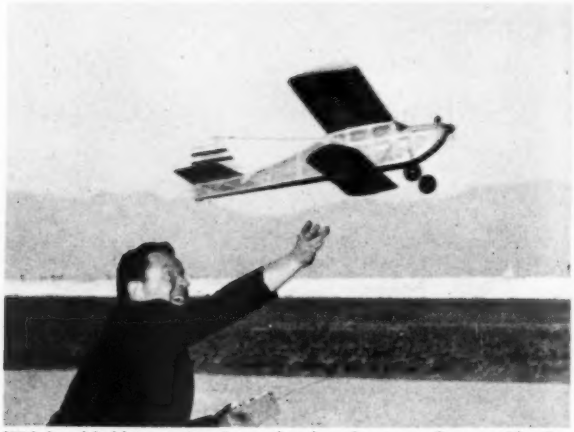
Elf four, glow or ignition, like other Elfs, has displacement of .396, with three main bearings, single air intake, and bare weight of 9 oz.





Breezy

By KEN WILLARD



With hand-held transmitter in one hand, author tosses Breezy with other. Without lower wing, ship takes more area but is first rate competitor.

For flying in small areas, this .049-powered bipe will do figure eights within a 150-foot circle. Development of unique ship well worth reading.

In this flight shot, Breezy still has Duranita lower wing in place. Plans show matching tips. Kick elevator, by Babcock escapement, featured.

Radio controlled models, for the most part, require pretty large open areas in order to be flown and maneuvered with any degree of safety. This is no particular drawback for those fellows who live in the smaller communities where a short drive puts them out in the country, but for the enthusiasts living in large cities, finding suitable flying areas gets to be quite a job. One notable exception to this is the City of Los Angeles, where the Department of Recreation and Parks is working closely with an Association of Hobbyists to provide not only an adequate area for radio jobs, but also for free flight and controlline flying as well.

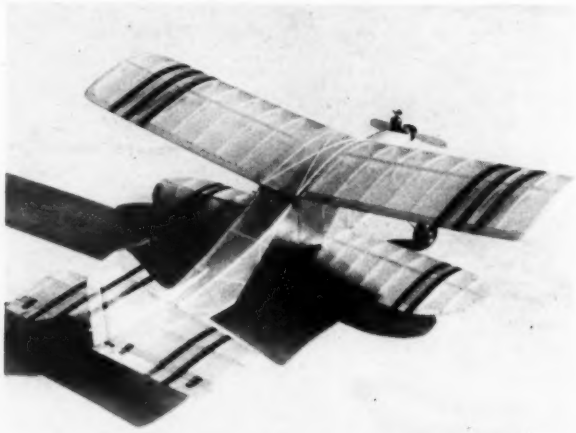
However, everybody can't move to Los Angeles to fly radio controlled models, so another solution is required. This solution, naturally, is to design a radio job that can maneuver inside an area like a football field. And this is no small problem of design. Many things besides the airplane itself must be considered, such as noise tolerability, minimum danger to surrounding buildings in the event of malfunction, ability to get out of tight spots, etc. It's really a challenge to try and come up with the answer.

Certain decisions were obvious. The model should be Half-A powered to keep the noise level down. It should be light and small, so the danger of damage, both to the airplane and to whatever it might hit, would be minimized. It should be able to turn very sharply to stay out of trouble when close to the ground. It should have reliable radio.

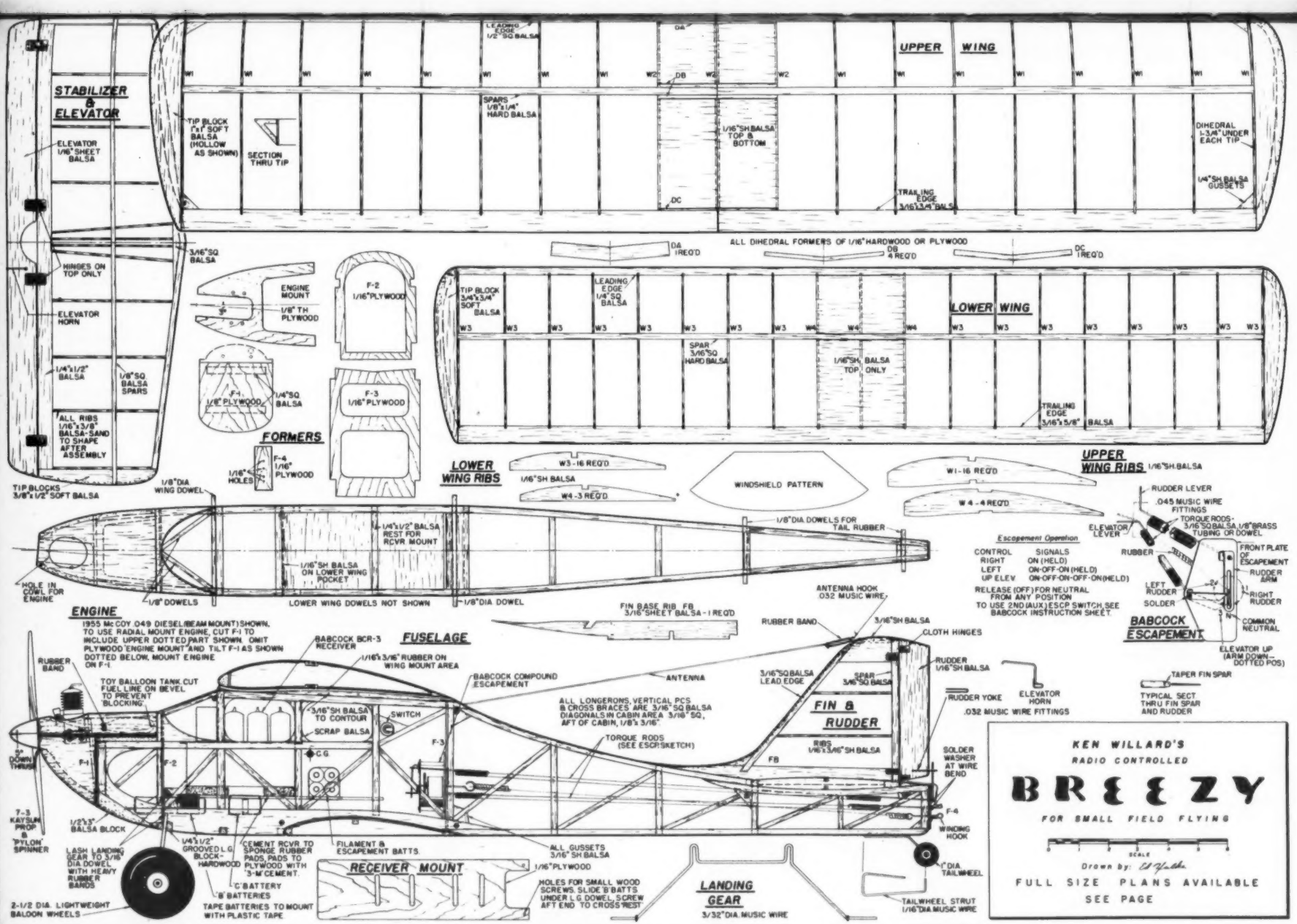
The first design I tried was a functional monoplane with a slab sided fuselage, just barely large enough to accommodate the Babcock BCR-3 receiver. It was, and still is, an amazing little machine, quite capable of holding its own in any competition flying—but it turned out to be too hot to qualify for the small field requirement. It is very easy to fly, but it takes up a lot of space as it maneuvers. Although it weighs 2 lb., the McCoy .049 Diesel or the new McCoy .049 glow engine gives it unbelievably good performance.

The performance of the first design was sufficiently encouraging, it appeared worth while to make another, only this time going all out for light weight and high lift in hopes of slowing the job down a little. So another monoplane was built, but the more complicated Warren truss type of built-up fuselage was used for lightness, and the NACA 6512 airfoil, which has undercamber, was used on the wing. By careful selection of wood the weight of the model was kept to 26 oz. (12 of which comprised the radio and battery weight). Again the results were encouraging, but still not satisfactory. This job could turn sharper and (*Continued on page* 46)

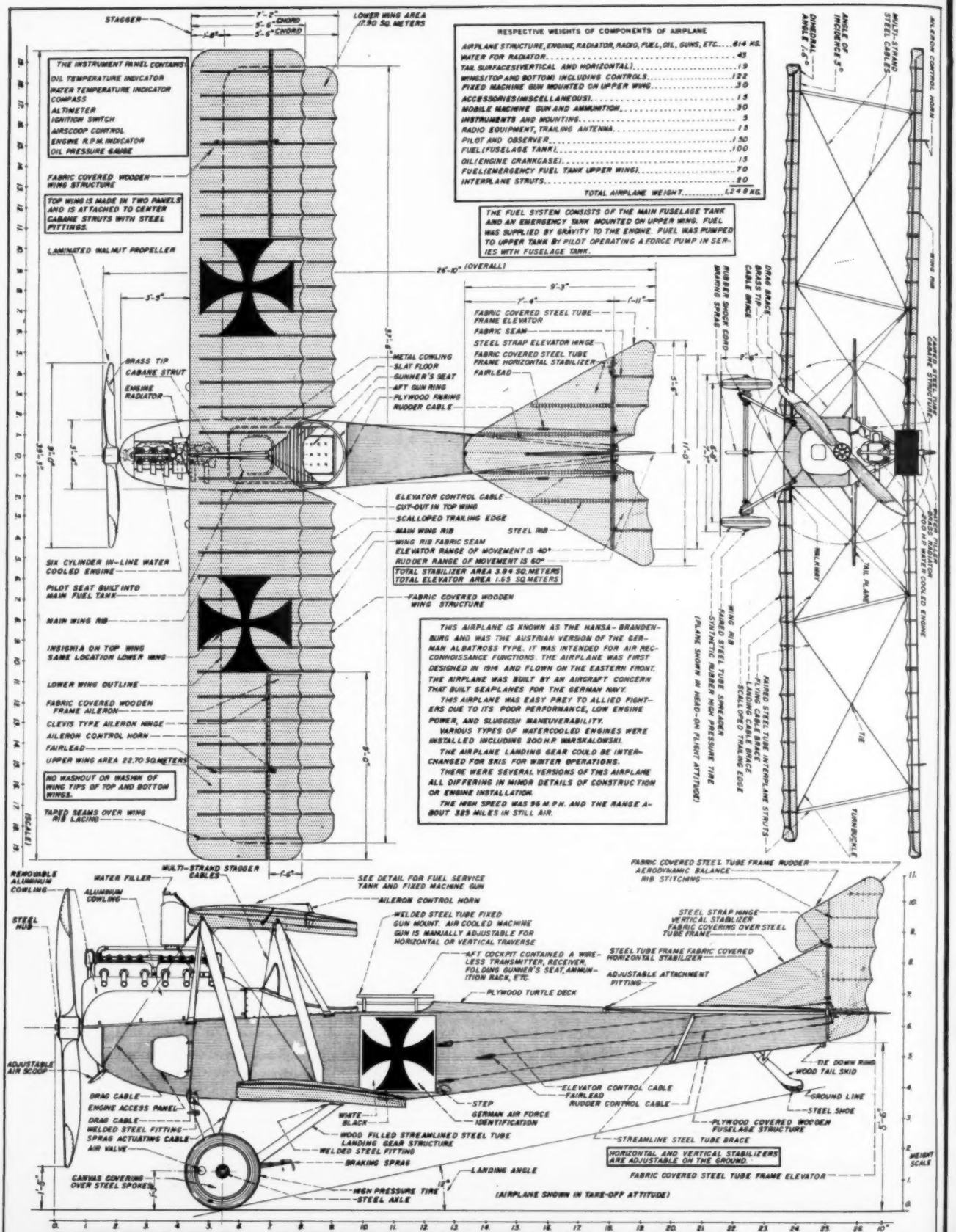
Three of series of five test ships show in this picture. Light construction alone is not enough for small field because performance jumps.



This was lightweight monoplane before lower wing was added. Finalized Breezy next. Only the hottest Half-A's; otherwise, bigger engine.



FULL SIZE PLANS AVAILABLE. SEE PAGE 50.

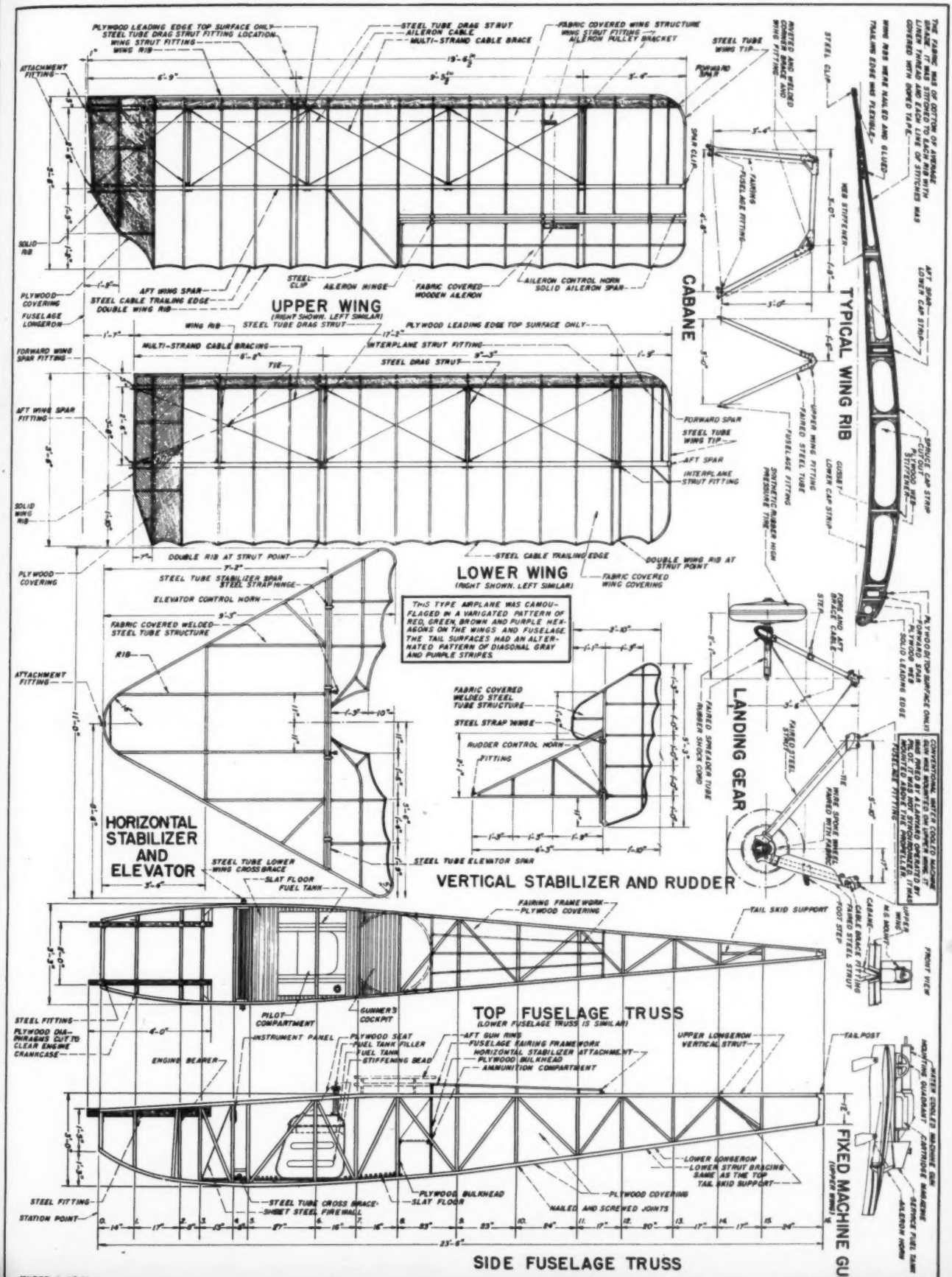


HANSA-BRANDENBURG

"MODEL LDD"

(SHEET NO. 1 OF 2)

DRAWN BY WILLIS L. NYE


UPPER WING
(RIGHT SHOWN, LEFT SIMILAR)
LOWER WING
(RIGHT SHOWN, LEFT SIMILAR)
CABANE
TYPICAL WING RIB
LANDING GEAR
HORIZONTAL STABILIZER AND ELEVATOR
VERTICAL STABILIZER AND RUDDER
TOP FUSELAGE TRUSS
(LOWER FUSELAGE TRUSS IS SIMILAR)
SIDE FUSELAGE TRUSS
FIXED MACHINE GUN
(UPPER WING)
THIS TYPE AIRPLANE WAS CAMOUFLAGED IN A VARIGATED PATTERN OF RED, GREEN, BROWN AND PURPLE HEXAGONS ON THE WINGS AND FUSELAGE. THE TAIL SURFACES HAD AN ALTERNATED PATTERN OF DIAGONAL GRAY AND PURPLE STRIPES.
CONVENTIONAL WATER COOLED MACHINE GUN WAS MOUNTED ON UPPER WING. IT WAS FIRED BY THE PILOT. IT WAS AIMED BY SIGHTS MOUNTED ABOVE THE PROPELLER.
PLYWOOD LEADING EDGE TOP SURFACE ONLY
STEEL TUBE DRAG STRUT
AILERON CABLE
MULTI-STRAND CABLE BRACE
FABRIC COVERED WING STRUCTURE
WING STRUT FITTING
AILERON PULLEY BRACKET
STEEL TUBE WING TIP
ATTACHMENT FITTING
WING RIB
SOLID RIB
PLYWOOD COVERING
FUSELAGE LONGERON
AFT WING SPAR
STEEL CABLE TRAILING EDGE
DOUBLE WING RIB
STEEL CLIP
AILERON HINGE
FABRIC COVERED WOODEN AILERON
AILERON CONTROL HORN
SOLID AILERON SPAR
SPAR CLIP
FORWARD SPAR
AFT SPAR
INTERPLANE STRUT FITTING
FORWARD WING SPAR FITTING
AFT WING SPAR FITTING
SOLID WING RIB
TIE
STEEL DRAG STRUT
DOUBLE RIB AT STRUT POINT
STEEL CABLE TRAILING EDGE
FABRIC COVERED WING COVERING
PLYWOOD COVERING
STEEL TUBE STABILIZER SPAR
STEEL STRAP HINGE
ELEVATOR CONTROL HORN
FABRIC COVERED WELDED STEEL TUBE STRUCTURE
RIB
STEEL TUBE ELEVATOR SPAR
FABRIC COVERED WELDED STEEL TUBE STRUCTURE
STEEL STRAP HINGE
RUDDER CONTROL HORN
FITTING
STEEL TUBE LOWER WING CROSS BRACE
SLAT FLOOR
FUEL TANK
FAIRING FRAME WORK
PLYWOOD COVERING
TAIL SKID SUPPORT
PILOT COMPARTMENT
GUNNER'S COCKPIT
STEEL FITTINGS
PLYWOOD DIAPHRAGMS CUT TO CLEAR ENGINE CRANKCASE
ENGINE BEARER
INSTRUMENT PANEL
PLYWOOD SEAT
FUEL TANK FILLER
FUEL TANK
STIFFENING BEAD
AFT GUN RING
FUSELAGE FAIRING FRAMEWORK
HORIZONTAL STABILIZER ATTACHMENT
PLYWOOD BULKHEAD
AMMUNITION COMPARTMENT
UPPER LONGERON VERTICAL STRUT
TAIL POST
LOWER LONGERON
LOWER STRUT BRACING SAME AS THE TOP
TAIL SKID SUPPORT
PLYWOOD BULKHEAD
SLAT FLOOR
PLYWOOD COVERING
STEEL TUBE CROSS BRACE
SHEET STEEL FIRE WALL
NAILED AND SCREWED JOINTS
STATION POINT
23'-6"
STEEL CLIP
WING RIB MEAT NAILED AND GLUED
TRAILING EDGE WAS FLEXIBLE
THE FABRIC WAS OF COTTON OF AIRMAIL GRADE. IT WAS STITCHED TO EACH RIB WITH LACING CORD AND EACH LINE OF STITCHES WAS COVERED WITH DOPED TAPE.
RIVETED AND WELDED WING STRUT FITTINGS
RIB STIFFENER
FAIRING
FUSELAGE FITTING
FORWARD SPAR
STEEL TUBE WING TIP
AFT SPAR
INTERPLANE STRUT FITTING
FUSELAGE FITTING
SYNTHETIC RUBBER HIGH PRESSURE TIRE
FUSELAGE STEEL TUBE
UPPER WING FITTING
GUSSET
LOWER CAP STRIP
SPRUCE CAP STRIP
PLYWOOD WEB
PLYWOOD WEB STIFFENER
PLYWOOD TOP SURFACE ONLY
SOLID LEADING EDGE
FORE AND AFT BRACE CABLE
STEEL
FAIRED STEEL STRUT
RUBBER SHOCK CORD
FAIRED SPREADER TUBE
TIE WIRE STONE WHEEL FAIRED WITH FABRIC
AXLE
FOOT STEP
CABANE
CABLE BRACE FITTING
FAIRED STEEL STRUT
M.G. MOUNT
UPPER WING
FRONT VIEW
WATER COOLED MACHINE GUN
MOUNTING QUADRANT
CARTRIDGE MAGAZINE
GASOLINE FUEL TANK
AILERON HORN
STATION POINT
14" 1 17" 2 5'-8" 3 12" 4 5 5'-8" 6 16" 7 16" 8 33" 9 33" 10 34" 11 17" 12 30" 13 17" 14 17" 15 26" 16

(SHEET 2 OF 5)

Spitfire Stunter

By FRANK B. BAKER

With a few modifications from true scale this designer turned out a realistic machine that performs the stunt pattern. For .29 to .36 engines.

Many stunt fliers desire to have a fighter type aircraft that stunts yet maintains its scale appearance. The Supermarine Spitfire fills the bill. Its large wing and graceful lines have made it a favorite with model builders for years. It has natural stunt proportions though the elliptical wing may have kept most model builders from attempting a stunt version. The wing actually is not difficult to build.

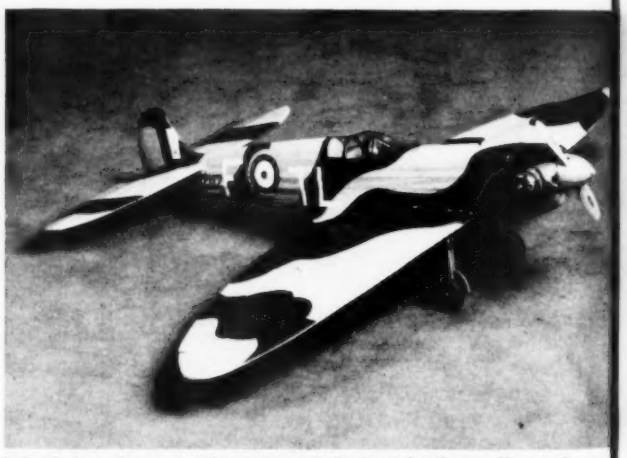
The construction of this plane must begin with the wing and the flaps. The wing spar is used as a jig and, as it is not a key structural member, it may be cut away later for the bellcrank. The ribs are placed on the spar and a piece of 1/4 in. balsa pinned to the trailing edge. The height of each rib is marked and the piece removed. Taper this spar according to the marks and note that spar extends to the wing centerline. The flap spars are constructed in the same manner but are 3/32 in. shorter in height throughout their entire length. Cut four flaps from 1/32 in. sheet and cement one right and one left to the flap spars. A 1/4 in. wide, 3/32 in. thick, outline of the trailing edge of the flap is added to strengthen the flap trailing edge. The flap ribs and block at the root end are added. This block and the reinforcement are tapered to match the ribs. The top sheet is then added and the leading edge rounded.

Hinges and flap horns are added. Be sure to put the hinge on the flap horn before installation. Attach the flaps to the rear wing spar *before* cementing this whole assembly to the ribs. The 1/16 in. sheet trailing edges are added and allowed to overlap the flaps approximately 1/16 in. Don't worry about the flaps moving at this time. The leading edges are cemented in place. The 1/16 in. sheet is placed on the *top* of the wing and a slot cut for the body width *only* of Former 4. Mount the landing gear on Former 4 and cement into the wing; then add the lower 1/16 in. sheet. The rest of the wing is constructed by normal methods. The pushrod cross arm is installed and the flaps can be freed by trimming the overlapping 1/16 in. sheet. The flap arms move in an arc, hence may need some adjustment. A 3/4 oz. lead is added to the outboard tip, as far forward as possible.

Cut the body sides from hard 3/32 in. sheet and assemble Former 2, the motor mounts, tank, body sides, and the assembly containing Former 4 simultaneously as a unit. Cement the body sides to the wing after the remaining body formers have been installed between the body sid The body sides do considerable twisting in and out, which is necessary to maintain the oval cross-section. The top of the body from Formers 2 to 6T is covered with a 3 in. wide sheet of 1/16 in. Soak this in hot water and it will make the transition from a square section at Former 2 to the round section at Former 4 with ease. The stringers can be added at this time. The side stringers taper from the front and back to a maximum thickness about Former 8.

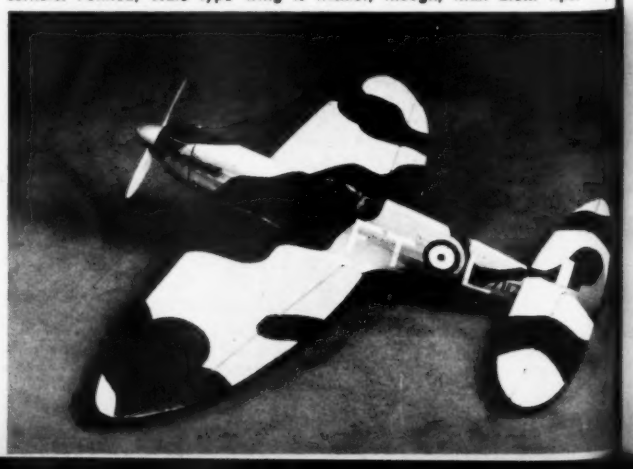
The elevator is built by lightly cementing two sheets of 3/16 in. together. The elevator is shaped and the cut-out removed. The sheets are then split (*Continued on page 42*)

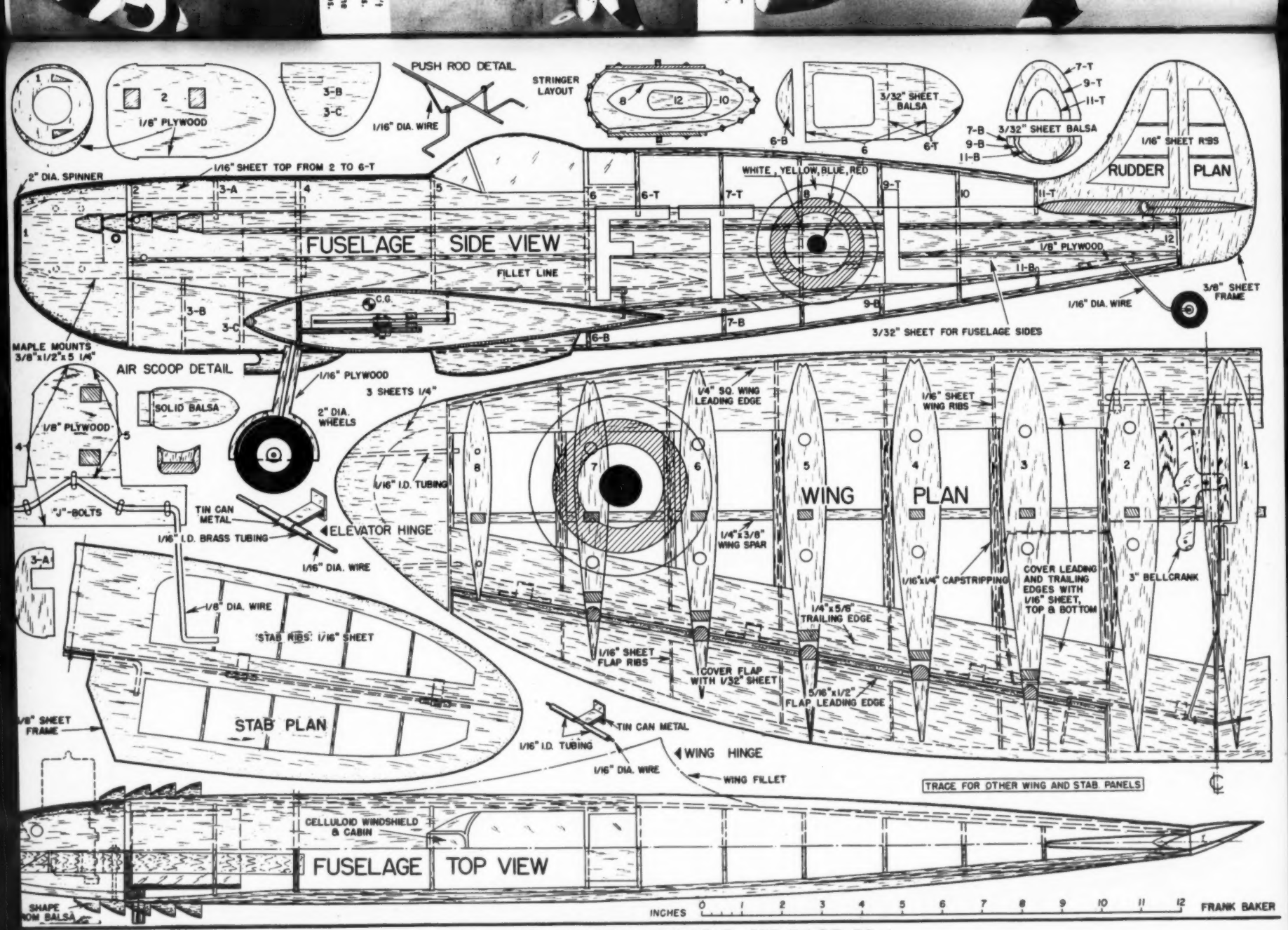
If you find yourself admiring Baker (pardon, Frank) instead of the Spitfire, blame it on that effective sand-and-spinach camouflage. A big ship.



Only obvious change was big increase in horizontal tail area. You can't stunt without flippers, bub! The cylinder you'll see wherever it goes.

Big flaps, working in conjunction with the flippers, help get around the corners. Pointed, scale type wing is trickier, though, than blunt tips.





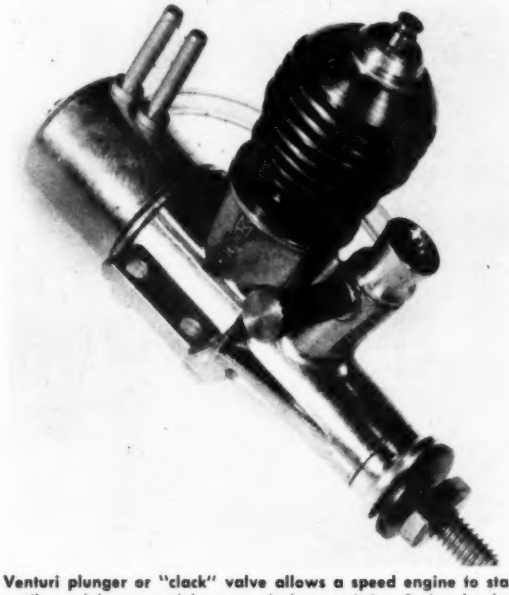
FULL SIZE PLANS AVAILABLE. SEE PAGE 50.

ENGINE REVIEW

By E. C. MARTIN

Four new McCoy engines give the modeling fraternity a flock of ideas to discuss. Typical of these features is the radical venturi plunger. Described are the .29 and .36 and the .049 Diesel and glow.

Mac .049 Diesel may look like the glow plugged engine, but it is altogether different inside. Finish is matt grey Diesel, polished glow.



Venturi plunger or "clack" valve allows a speed engine to start easily and keep good low speed characteristics. Spring loaded.

Front rotor design of the new .29 and .36 prove once more that you don't have to have the rear disc rotor for high performance.

▶ The almost simultaneous introduction of four new engines from a firm the size of McCoy is a prodigious feat of production planning, but even more impressive is the design approach revealed in the valve mechanism of the .049 Diesel and glow engines, for these little giants, by virtue of their unique valve arrangement, provide a most convincing answer to the feasibility of the all-purpose engine. They are as hot as a pistol and start as though you had pulled a trigger.

The new .29 and .36 engines follow a time honored and proven McCoy formula. They look like McCoys and behave like McCoys and inherit in large measure the rare qualities of their ancestor, the first McCoy .60, which set a standard of simplicity, stamina and performance that in our view has no parallel in the model engine field; for despite constant development in the bitterly competitive cauldron of speed flying, no basic changes emerged, only refinements of port design and metallurgy. If this sounds like an epitaph, it is because we hear that there are to be no more Macs with a Red Head, and we mourn their passing.

The new examples are sport-stunt engines of the front rotary, plain bearing layout with rear mounted fuel tanks and removable intake restrictors. The .36 has a ringed aluminum piston and the .29 a lapped steel piston in the normal McCoy multi-ported cylinder liner. Both engines employ identical pressure die-cast aluminum cylinder blocks, front covers and fuel tanks, and similar stroke permits the use of similar rods and crankshafts. The .29 has a bore of .750 and the .36 gets its displacement from .809 and the common stroke of .670.

The most significant thing about both engines is the very sturdy crankshaft of 7/16 diameter, which is fully counterbalanced and case hardened, with a 5/16 gas passage and rectangular valve port. It may be remembered that the old Sportsman .36 had a solid 3/8 shaft with disc rotary induction. The main bearing is bronze bushed with a 17/64 dia. circular port. The removable venturi restrictor brings the intake down to 7/32, thus producing a powerful suction, especially in the .36, with the standard McCoy spraybar unit.

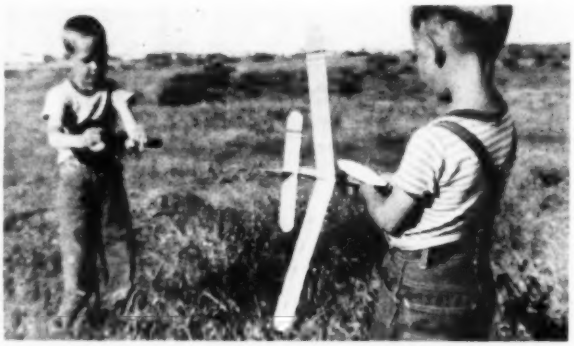
The cylinder bore of the lapped engine is well finished and the sleeve is a nice slip fit in the block. The steel piston is very light with the walls kept to the minimum for effective wrist pin support, and a spacer is provided on the tubular wrist pin to keep the conrod from rubbing on the rear of the crankcase. A high straight baffle is milled across the piston crown to match the four bypass ports.

Both engines start well from an exhaust prime, but the lapped job is recommended for those who normally have trouble with this phase of operation. Torque is noticeably higher from the .36 but performance on small props on the examples tested was very similar. In (*Continued on page* 53)

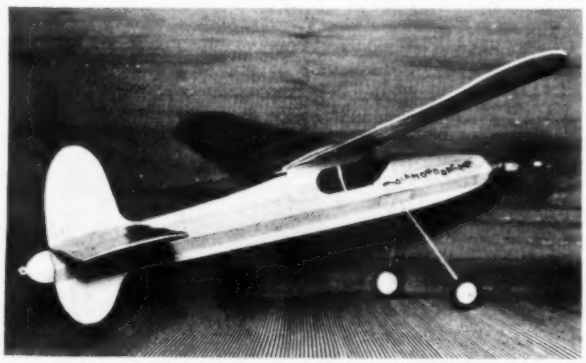
Diamond Back

By N. E. ANDERSON

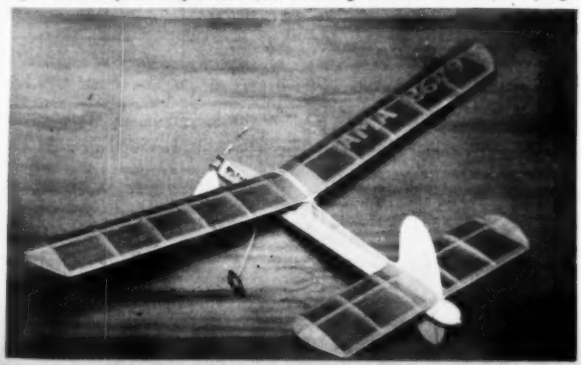
Two little boys and their daddy just couldn't see a good flying day go to waste, so a Sunday morn building session turned out this nifty rubber job.



The two co-pilots apply that winder for maximum turns just as do the big guys at contest. Hobby shop props are used; all told in the directions.



For a "quickie," Diamond Back is not half bad looking crate. Shown is a single-blade folding type prop but four optional prop set-ups possible. Though framework is reasonably warp resistant, use only two coats of light, clear dope on Japanese tissue covering. Removable nose, tail plugs.



Unique, easily built, diamond-shaped fuselage with its top and bottom finlike sheeting for profile appearance, is square, sheet balsa tube.

Actually, I cannot say that Diamond Back was designed. The plane came into being because two little boys and their daddy just couldn't see a perfectly good flying day go to waste. As usual, Leif and Johnny were out of bed at sunrise and climbing all over me on the Sunday morning Diamond Back was born. They wanted to go flying! It was a typical California morning; the air was warm and still.

After breakfast we took inventory of our model squadron and eliminated one by one all our planes because of damage from mishaps and need for parts. The boys were so disappointed. The hobby shop was closed, so we decided to make the most of what was in the workshop.

The three of us grouped around the dining room table with Mom tossing in suggestions now and then from various parts of the house as to what we could build with what we had. We decided on a small sport rubber job with lines that would adhere fairly close to what a conventional airplane should look like.

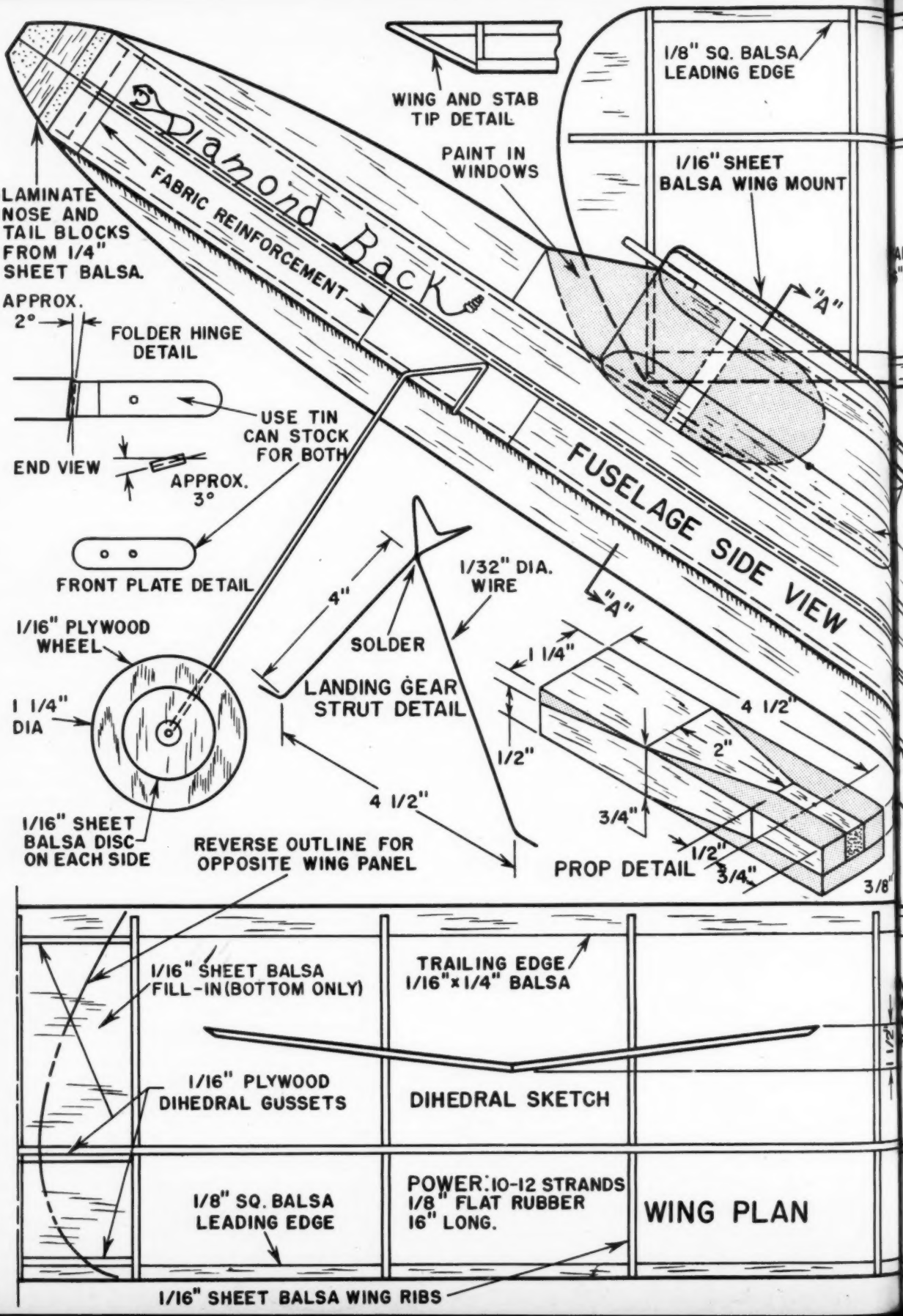
We borrowed some of Mom's white shelf paper and laid out the wing and stabilizer planform. The airfoil sections for the wing and stab are all our own and were chosen at random with one thing in mind: to give a moderate amount of lift without too much drag. The fuselage had to be a simple and strong affair that wouldn't take too much time to build, so we decided on a diamond slab. To make the lines more pleasing to the eye, we added the top and bottom profiles of sheet balsa, along with the sheet balsa rudder and sub-rudder.

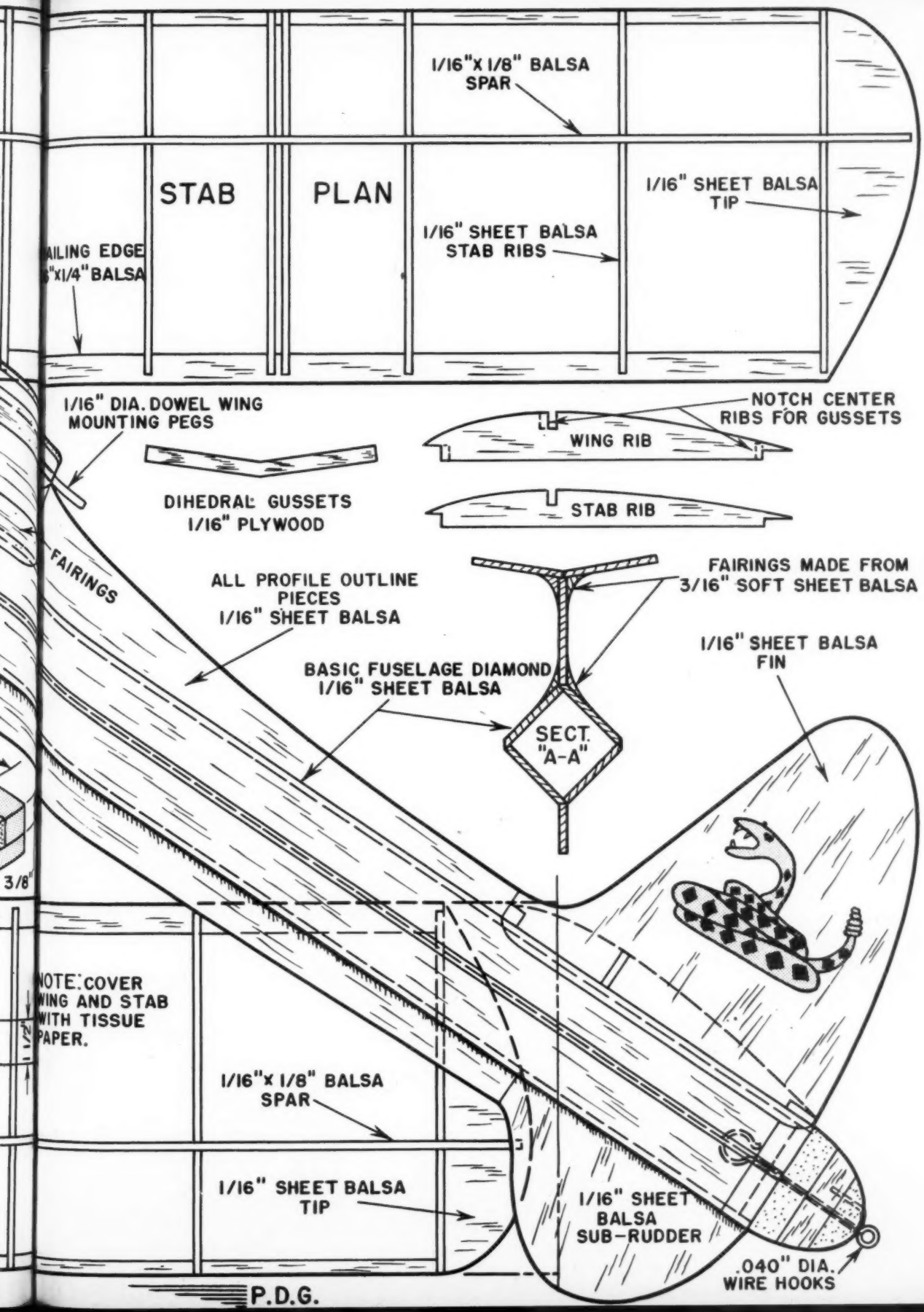
Almost as soon as the rough sketch was completed and the available material assembled on the dining room table, Diamond Back went into production. In less than three hours we were on our way out to the wide open spaces for some flying. Preliminary tests consisting of hand glides and a few short hand-wound flights were in no way spectacular. However, after we packed in over 500 turns with a winder and let Diamond Back go, many eyes opened wide at first and then strained hard to see the little plane climbing in smooth circles upward, culminating in a perfect transition from power to glide, riding the warm thermals for a first full powered flight of over two minutes. Needless to say, for the rest of the day and many days thereafter, much respect was shown whenever it took to the air.

Being a modeler and therefore prone to experimenting, I tried many different combinations of propellers and motors on subsequent days of flying. These notes will follow construction details.

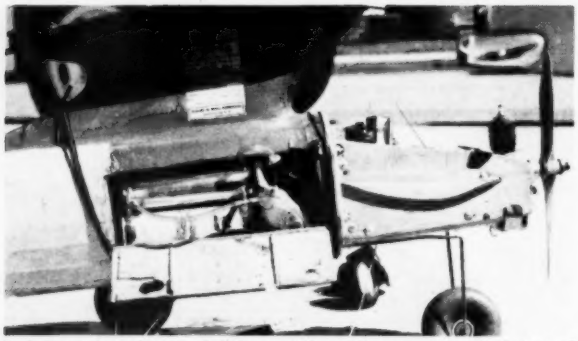
Let's dig into your workshop and get what you need to start your Diamond Back. If you (*Continued on page 36*)

PLANS ON FOLLOWING TWO PAGES


Diamond Back
WING AND STAB TIP DETAIL
1/8" SQ. BALSA LEADING EDGE
PAINT IN WINDOWS
1/16" SHEET BALSA WING MOUNT
LAMINATE NOSE AND TAIL BLOCKS FROM 1/4" SHEET BALSA.
FABRIC REINFORCEMENT
"A"
APPROX. 2°
FOLDER HINGE DETAIL
USE TIN CAN STOCK FOR BOTH
END VIEW
APPROX. 3°
FUSELAGE SIDE VIEW
FRONT PLATE DETAIL
1/32" DIA. WIRE
4"
SOLDER
"A"
1/16" PLYWOOD WHEEL
1 1/4" DIA
LANDING GEAR STRUT DETAIL
1 1/4"
4 1/2"
2"
1/2"
4 1/2"
3/4"
1/16" SHEET BALSA DISC ON EACH SIDE
REVERSE OUTLINE FOR OPPOSITE WING PANEL
PROP DETAIL
1/2"
3/4"
3/8"
1/16" SHEET BALSA FILL-IN (BOTTOM ONLY)
TRAILING EDGE 1/16" x 1/4" BALSA
1/16" PLYWOOD DIHEDRAL GUSSETS
DIHEDRAL SKETCH
1/8" SQ. BALSA LEADING EDGE
POWER: 10-12 STRANDS 1/8" FLAT RUBBER 16" LONG.
WING PLAN
1/16" SHEET BALSA WING RIBS

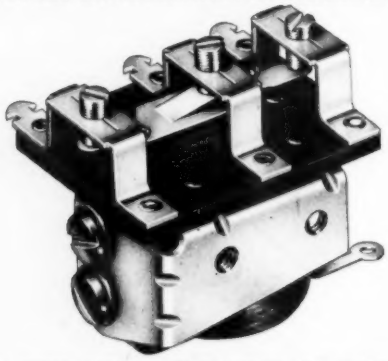

1/16"x 1/8" BALSA SPAR
STAB PLAN
1/16" SHEET BALSA TIP
1/16" SHEET BALSA STAB RIBS
AILING EDGE "x1/4" BALSA
1/16" DIA. DOWEL WING MOUNTING PEGS
NOTCH CENTER RIBS FOR GUSSETS
WING RIB
DIHEDRAL GUSSETS 1/16" PLYWOOD
STAB RIB
FAIRINGS
ALL PROFILE OUTLINE PIECES 1/16" SHEET BALSA
FAIRINGS MADE FROM 3/16" SOFT SHEET BALSA
1/16" SHEET BALSA FIN
BASIC FUSELAGE DIAMOND 1/16" SHEET BALSA
SECT. "A-A"
3/8"
NOTE: COVER WING AND STAB WITH TISSUE PAPER.
1/16"x 1/8" BALSA SPAR
1/16" SHEET BALSA TIP
1/16" SHEET BALSA SUB-RUDDER
.040" DIA. WIRE HOOKS
P.D.G.

Radio Control News

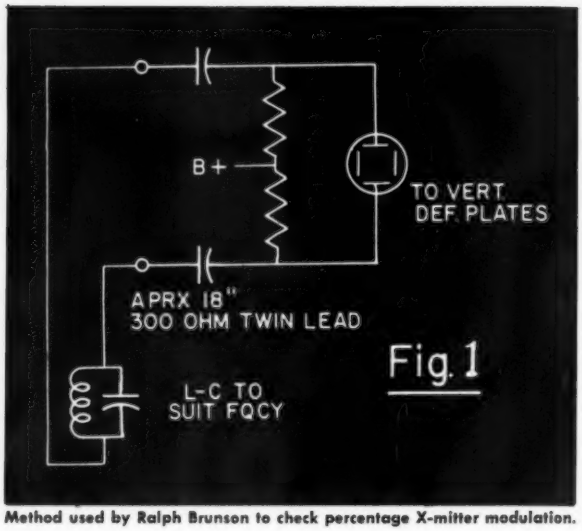


E. J. Brown's endurance Sailplane, Arden .19, totes 50 oz. fuel—two of four tanks show—a 180 minute run. E. J. teams with Wes Ettridge.

Still another variation of the Coast-modified Capitol Cubs, this one by Bob Beckman. Most obvious modification is a reduction in the dihedral.



Lightweight, rugged design, greater freedom from contact pitting or sticking are among advantages of new Advance Electric Series 50 relays.



Method used by Ralph Brunson to check percentage X-mitter modulation.

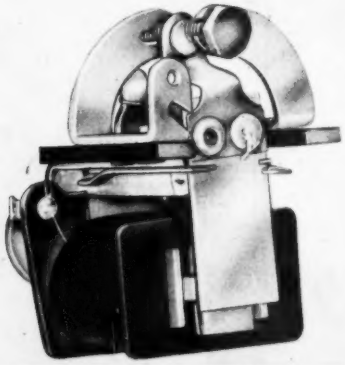
By E. J. LORENZ

Would you like to fly on 52-54 mc? Sounds wonderful, doesn't it! Well, it isn't too hard. Here's how. Also, technical topics, new items, developments, in one of the liveliest round-ups to date.

There has been much concern over the "various" RK-61 tubes. Our checks, and those of others in the field, have shown that these tubes will function well in two-tube operation. While the exact operation of a super-regenerative receiver is a science in itself, we shall only attempt to give you a few details which should help you obtain better performance from your designs.

A super-regen detector employs a quench frequency, which may be "self-generated" in a single-tube circuit or be fed into the detector by an external signal source. This quench frequency, usually in the 15 to 50 kc range, tends to "block" the incoming signal, thus allowing that signal to build up in amplitude. The greater the difference between the quench frequency and the incoming signal frequency, the longer this build-up continues. This action, basically, governs the sensitivity and also the selectivity of the circuit. Many of you have probably noted the increased sensitivity of a receiver when operating in the 50-54 mc band. Also, the (*Continued on page* 49)

New Badaco stable over wide voltage range. The X-mitter can be used for carrier, tone, multi.



New Kurman relays with screw contacts incorporate improvements based on long use for models.

Late model DMECO servos feature stepped-up action and smoothness of operation. Muscle!

FOR THE RC FAN

By ED YULKE

Escapements pull in, drop out. Bad adjustment, flyaway, spin-in. Not always due interference.

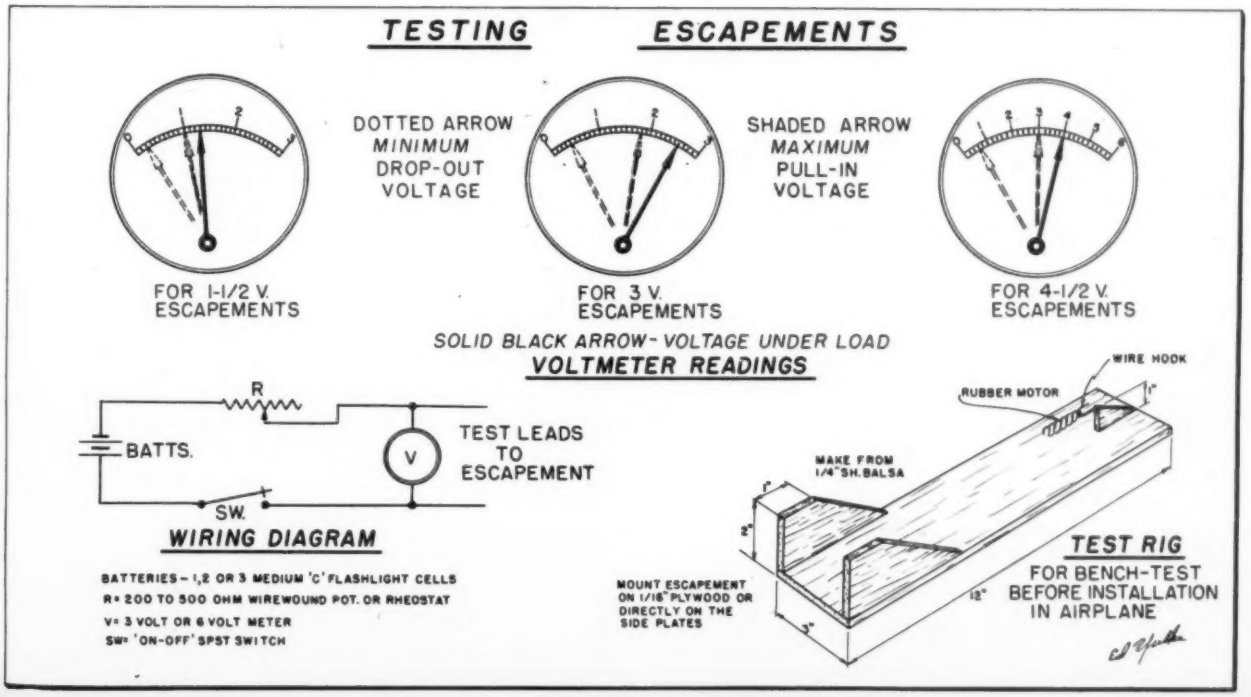
There are many ways to check an escapement to see if it's working, but it still may not be working *properly*. Flick the armature on the relay before a flight; the escapement may kick in and out properly; then, half way through the flight, fail to pull in, or, as happened to the writer, fail to neutralize. What a smash that one was!

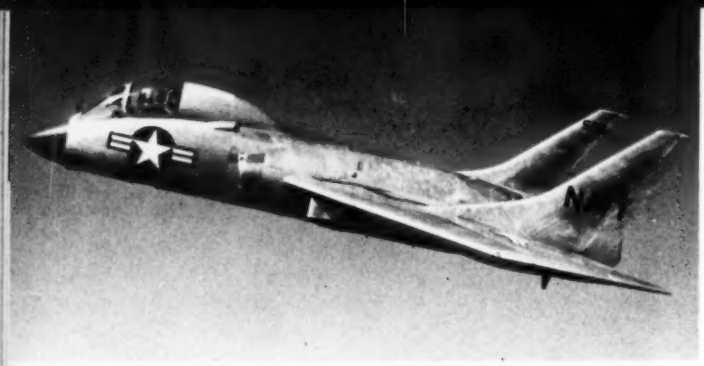
Just as you leave a "margin" of current above and below relay operation, *there must be a margin of current and spring tension on escapements* for consistent operation. With the rubber wound full of knots and the drag of the linkage on the escapement, it should neutralize (go back to neutral position) when the voltage is cut down to a certain point, but not off *completely*. If the current must be cut off completely, when the ship is standing on the ground without air loads on the rudder, then as soon as the ship is flying, the extra load may be enough to hold the escapement in the operating position. The unfortunate part of it all is that engine vibration will kick it loose. In the glide, however, the load is there but it won't come back! Then reach for the shovel and basket. If the current must be cut off completely to neutralize, increase spring tension.

More than one ship has flown away with the radio working as slick as you please—but who knows it? The escapement won't work! Batteries, under repeated load, fall off in the current they can deliver. On a 3-volt escapement, the batteries may read 2.6 volts with the escapement pulled in. That's fine, but if the escapement needs 2.5 volts to be pulled in and the batteries drop to 2.2 volts during the flight—one flyaway coming up. With a fresh set of two size C flashlight cells in series on any 6 to 10 ohm escapement, in the airplane, measure the voltage under load before you fly and afterward. Better still, blip the ship on the bench for a *measured* (timed) five minutes; then measure the voltage under load. You'll be amazed.

A voltmeter, pot, batteries, enable quick check escapement pull-in and drop-out currents. Sometimes springs tire and drop-out does not occur.

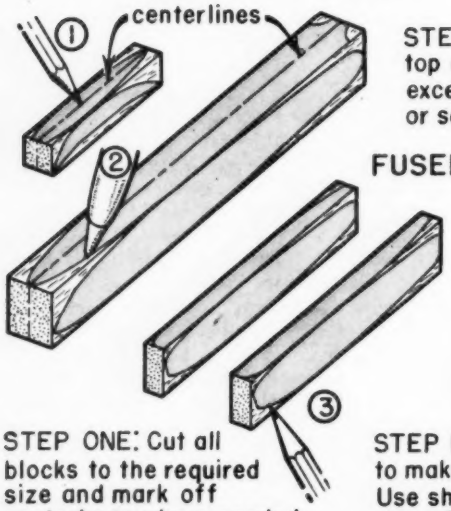
No 3-volt escapement should be flown if it needs more than 2.0 volts to pull in and it should drop out when the voltage is reduced to .4 volt. The figures and settings found best, using the rheostat and battery set-up shown, are plotted on the dials in the diagram for the three most popular voltage escapements. If your escapement won't pull in within a few tenths of a volt of the ratings shown, make certain there are no burrs on the pawl or fly arm. If you have increased the spring tension, be sure that the pull-in value has not been raised too high. The best way to clean off burrs on an escapement is to scrape the surface gently with a razor blade or mat-knife blade, drawing the (*Continued on page* 43)





SOLID CUTLASS

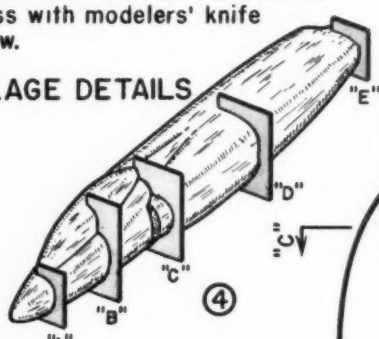
By PAUL E. DEL GATTO



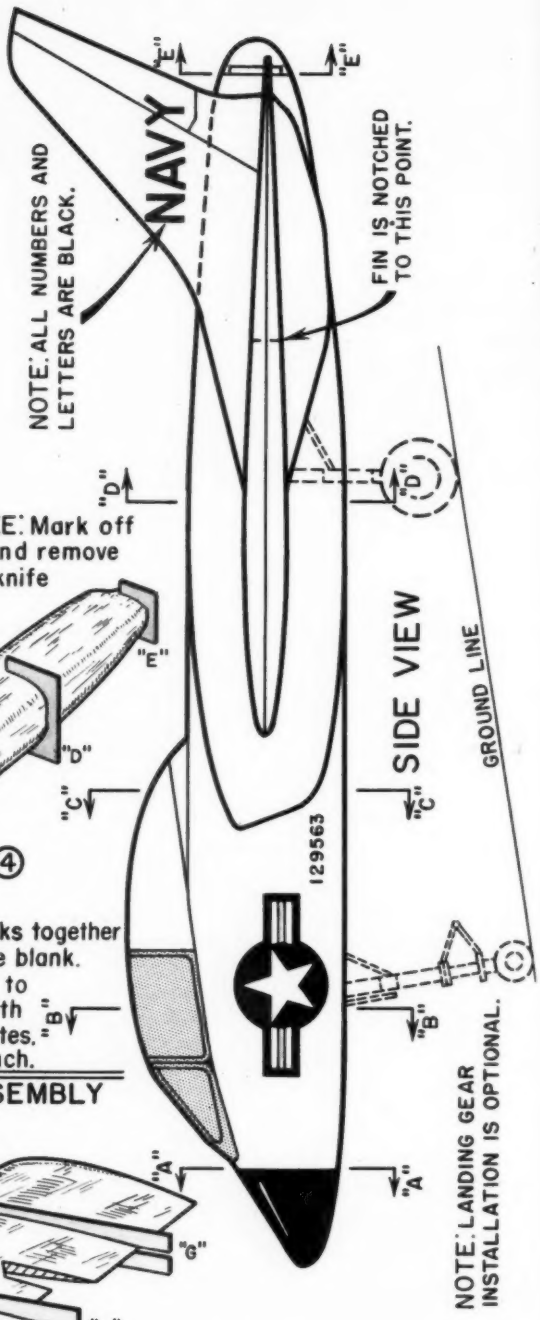
STEP ONE: Cut all blocks to the required size and mark off centerlines where needed, with ballpoint pen or pencil.

STEP TWO AND THREE: Mark off top and side outlines and remove excess with modelers' knife or saw.

FUSELAGE DETAILS

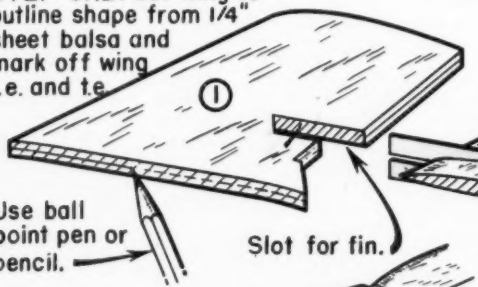


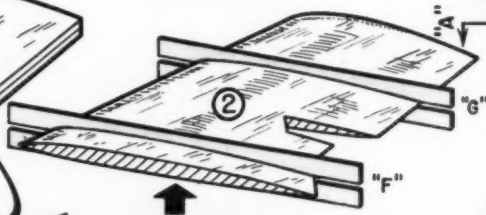
STEP FOUR: Cement blocks together to make complete fuselage blank. Use sharp modelers' knife to carve fuselage to shape with the aid of fuselage templates. Sand smooth for final touch.



WING AND ASSEMBLY DETAILS

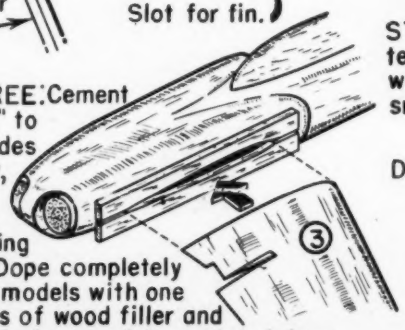
STEP ONE: Cut wing to outline shape from 1/4" sheet balsa and mark off wing l.e. and t.e.



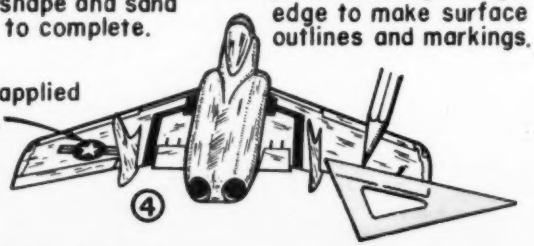


STEP TWO: Using wing templates as a guide carve wing to shape and sand smooth to complete.

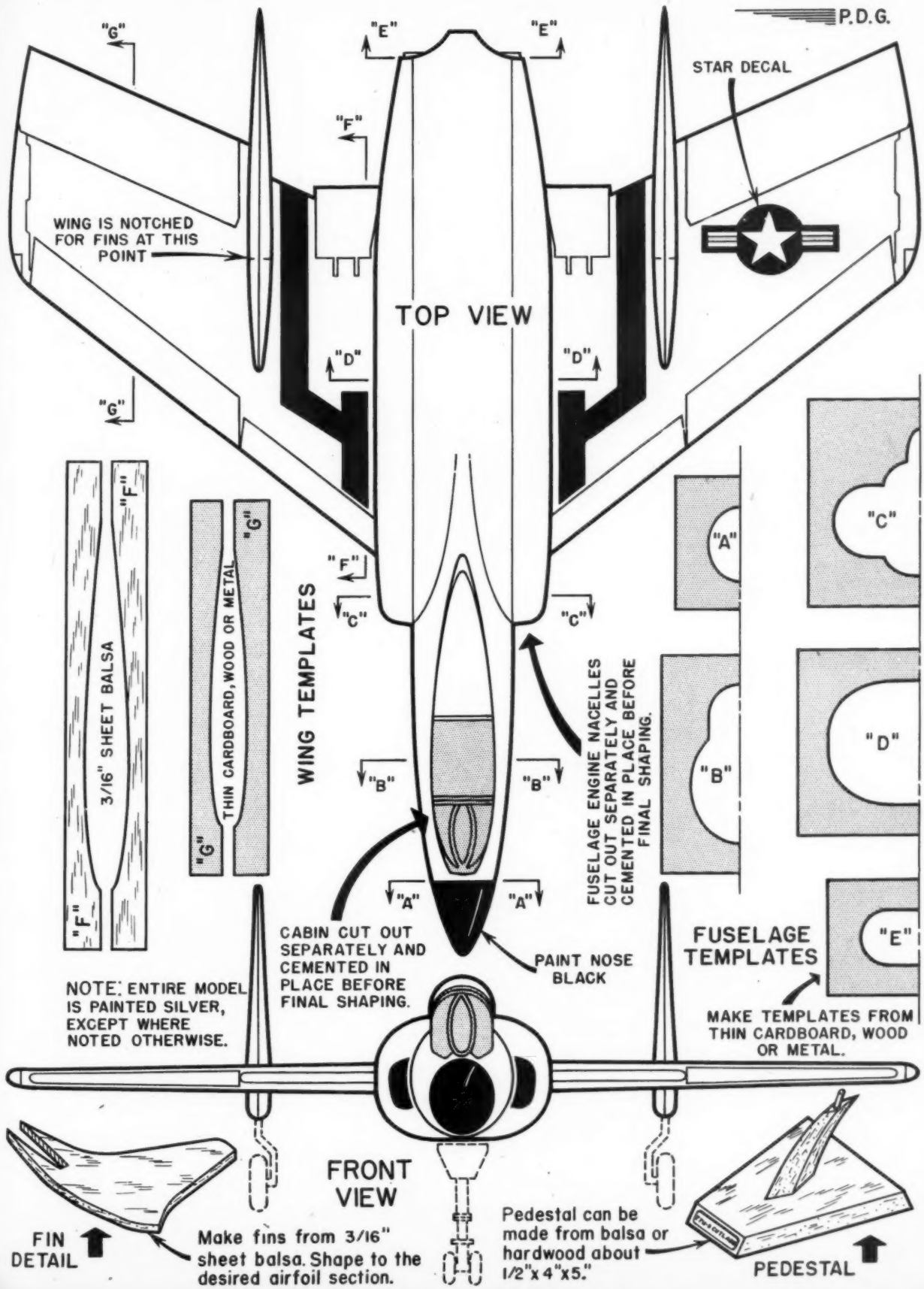
STEP THREE: Cement template "F" to fuselage sides temporarily, to be used as jigs for accurate wing assembly. Dope completely assembled models with one to two coats of wood filler and clear dope before applying colored dope.



STEP FOUR: Use ball point pen or pencil and any straight edge to make surface outlines and markings.



SCALE: 3/16" = 1 FT.


P.D.G.
STAR DECAL
"G"
"E"
"E"
"F"
WING IS NOTCHED FOR FINS AT THIS POINT
TOP VIEW
"D"
"D"
"G"
"F"
"G"
3/16" SHEET BALSA
THIN CARDBOARD, WOOD OR METAL
"F"
"G"
WING TEMPLATES
"F"
"C"
"C"
"B"
"B"
"A"
"A"
FUSELAGE ENGINE NACELLES CUT OUT SEPARATELY AND CEMENTED IN PLACE BEFORE FINAL SHAPING.
CABIN CUT OUT SEPARATELY AND CEMENTED IN PLACE BEFORE FINAL SHAPING.
PAINT NOSE BLACK
NOTE: ENTIRE MODEL IS PAINTED SILVER, EXCEPT WHERE NOTED OTHERWISE.
"A"
"C"
"B"
"D"
"E"
FUSELAGE TEMPLATES
MAKE TEMPLATES FROM THIN CARDBOARD, WOOD OR METAL.
FRONT VIEW
FIN DETAIL
Make fins from 3/16" sheet balsa. Shape to the desired airfoil section.
Pedestal can be made from balsa or hardwood about 1/2"x 4"x5."
PEDESTAL

Everything YOU WANT IN AN

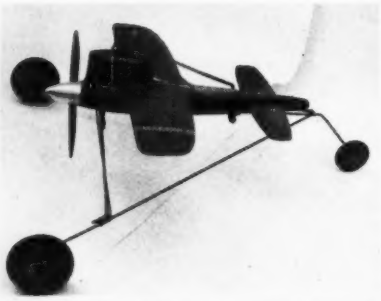
ALL-PURPOSE FUEL FOR STUNT, CONTEST,

OR JUST-FOR-FUN FLYING

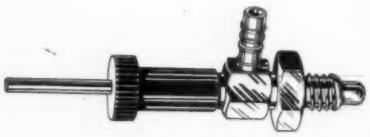
By every standard of comparison — easy starting, all-weather performance, power output, quality and quantity of lubrication — Testor's "39" is the outstanding all-purpose fuel for all standard model engines. It was developed after many months of research; flight-tested and approved by experienced modelers under the most extreme conditions of stunt, contest, and just-for-fun flying. *Now . . . see for yourself!* You'll find Testor's "39" in half-pint, pint, and quart cans at dealers everywhere.

TRADE SHOW

MONTHLY REVIEW OF NEW PRODUCTS, OTHER INTERESTING ITEMS WORTH ATTENTION



▸ *Speedwagons:* Many newcomers to speed model flying will be interested in availability of Speedwagon kits. Class A, B, D at respectively $3.95, $4.95, $5.95. Designated respectively the "20," "29," and "50." Die-cut, carved, shaped. By deBolt Model Engineering Co., Williamsville, N. Y.



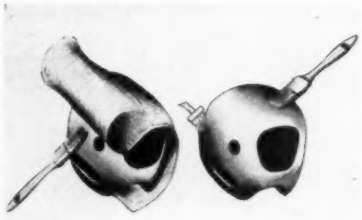
▸ *Go-Jet:* Fuel line and needle valve control can be on same side of engine with G-Jet Needle Valve. Kading Specialties Co., 215 E. Palmer Ave., Compton, Calif. Eliminates kinked fuel lines. In two sizes: .074 to .15 and .19 to .60, fits all makes. Self-tapping screw, plug. Price 85¢.

▸ *Winge-e:* Mechanical bird or ornithopter, uses rubber bands for power and has wings and tail covered with Mylar polyester film. Wings flap and machine flies quite well. Swoops, soars and dives. Manufactured by Hilb & Co., 1820 Lawrence St., Denver 2, Colo., sells for $1.19.

▸ *Trixy:* Lou Andrews designed, 45-inch U-control stunt model by Paul K. Guillow, Inc., Wakefield, Mass., gives top performance in stunt, combat or sport flying. Swept-

wing design gives modern look. Engines of .19 to .36 displacement. Kit includes a finished duraluminum gear, shaped and notched wing edges, shaped and rounded fuselage, etc. Lists $4.95.

▸ *Fibreglas:* Giving a tremendous boost in structural strength, particularly on RC job front ends, or on boat hulls, are Fibreglas and Fyb-Res by Berkeley Model Supplies,

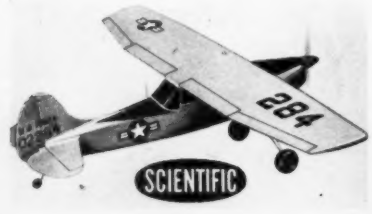


West Hempstead, N. Y. Glass cloth costs $1.25 sq. yd.; 8 ounces of resin and hardener, $1.95. Good for wheel pants, cowls, etc.; drills, sands, takes color dope or can be polished.

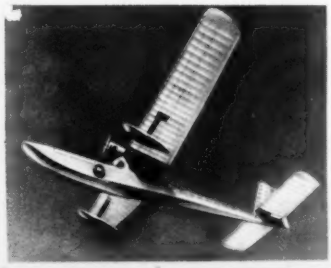
▸ *Thunderbird:* Latest of Bob Palmer's stunt designs is the Thunderbird, by Henry Engineering Co., Burbank, Calif. It's a big one at 54 in. Has 597 sq. in. wing area, weighs 36

ounces with a .20 to .35 engine. Kit includes three-dimensional picture plans, all prefabricated parts. Like other Palmer designs, it has wing flaps that work in conjunction with elevators. Price is $8.95.

▸ *Bird Dog:* Popular Cessna Liaison L-19A, designed for Scientific Model Airplane Co., 113 Monroe St., Newark 5, N. J. by Walter Musciano. Span is 18 in.; airfoiled wing, carved balsa fuselage, cowl, etc., for Half-A engines. At $1.50 is one of four scale jobs in series.



▸ *Custom Privateer:* Huge flying boat kit by Berkeley Model Supplies, West Hempstead, N. Y., this is biggest model kit in world. For RC or FF, spans 9-1/2 ft., has 1,440 sq. in. area. Takes engines of .45 to 1.20, weighs 9-1/2 lb. with radio. Fully pre-fabricated at $19.95.



▸ *Chris Craft Monterey:* This 21-foot outboard express cruiser is kitted in one-inch scale by Sterling Models, Philadelphia, Pa. Takes gas engines or electric motor drive. Designed especially for radio control. Prefabbed with all hardware. Plans include radio installation. $5.95.

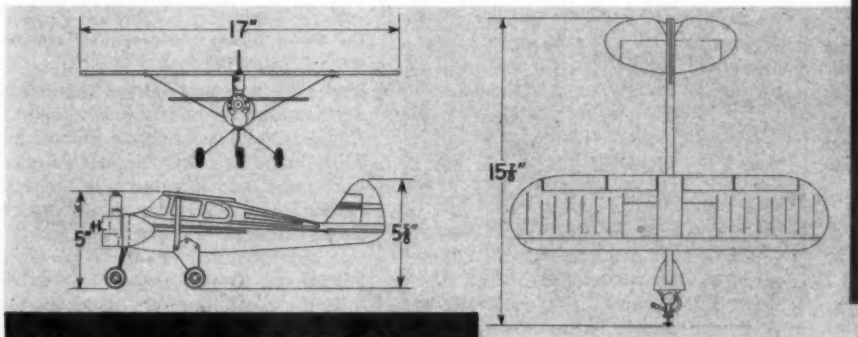
SPITFIRE'S *Ready-to-Fly* TRI-PACER

- Easy starting Spitzy .045 engine
- Sturdy tricycle landing gear
- New single line control
- A plane *anyone* can fly.
- Crash-proof construction of balsa and metal (no plastic parts)

Spitfire's TRI-PACER is a profile scale model of the 1955 Piper TRI-PACER. Engineered by Lew Mahieu, famous model builder and flyer, who says, "Anyone can take it off, fly it, and land it safely." Using a short control stick with a short line attached to the model, you merely direct the flight of the TRI-PACER from take-off to landing — *no previous experience necessary!*

You will thrill at the TRI-PACER's realistic flights and spend many hours of trouble-free flying with this new exciting TRI-PACER. Completely guaranteed by Spitfire Products Company.

Complete with engine $6.95



Always Use SPITFIRE FOR TOP PERFORMANCE

SPITZY
Factory Tested Easy Starting Ideal Beginners Engine
Complete with . . .
PROPELLER
GLOW PLUG
CLIP
SERVICE WRENCH **$3.95**

Special COMBINATION

$1.29

***Regular Value* $1.60**

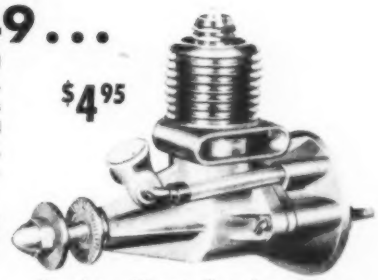
We make this offer to you at the height of the flying season! It is your opportunity to become acquainted with two of the greatest aids to better flying — the famous SPITFIRE GLOW PLUG and the new and improved NITROMIC FUEL, developed by Lew Mahieu. There is no limit to the number you may purchase, but the offer is for a limited time only. Take advantage of this special combination price and get yours today — a $1.60 value for only $1.29.

NEW 1955 SPITFIRE .049 . . .

. . . designed for the advanced model builder and flyer, who wants a small, lightweight .049 engine to power his model. Each SPITFIRE .049 is checked and TEST-RUN at the factory and, like all Spitfire engines, is guaranteed for 90 days.

THE ONLY .049 WITH A SIDE PORT EXHAUST STACK

$4.95



Complete with propeller, glow plug, clip and wrench

NEW SPITFIRE GLOW PLUG

. . . the greatest advance ever made in glow plug history. Engineering changes, a new method of winding, and a recently developed alloy in the platinum element adds up to a plug with 3 times longer life than the former outstanding SPITFIRE GLOW PLUG.

65¢

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SPITFIRE PRODUCTS CO.

P.O. Box 168, Compton, California

Now

"OPERATION R/C" easy as turning on a TV set!

THANKS TO BABCOCK.....you can now *go radio control* with professional ease and complete confidence. The *trouble-free* Babcock system makes radio control installation and operation a genuine pleasure. It's *"the one and only system you can trust implicitly in all environments!"*

Babcock

Lifetime • Fool-Proof • Military Type

RADIO CONTROL

Take tuning, *for instance!* Babcock's simple single screw tuning holds perfect adjustment for months of operation, one of the many Babcock features that spell *unmatched* RELIABILITY, your least costly and– *best investment, by far!*

Babcock SUPER COMPOUND ESCAPEMENT

MOST VERSATILE MOST EFFICIENT (four functions)...$7.95

● Special coaxial magnetic circuit guarantees *many times more efficiency* than that of any other escapement.

Babcock Elevator Servo (also for boats)..$12.50
Babcock BR-1 Subminiature Relay..... 9.00

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P. G. F. CHINN

FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

by P. G. F. CHINN

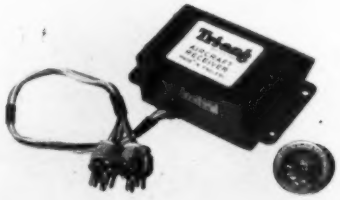
South African Nationals

South Africa's Nationals, a few days too late for a report in last month's FN, was a four-day meet, held at Capetown over the Easter week-end. To Pete Visser, former Secretary of the South African Model Aircraft Assn. and a prominent competitor, we are indebted for a most enlightening report.

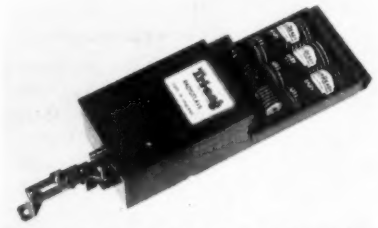
The SAMAA, by the way, is made up of 14 established clubs in the Union with a total membership of 520—i.e. an average of 37 per club—a figure which seems to compare well with that of more populous countries. The Association's HQ are in Capetown and organization is patterned somewhat on AMA lines, with engine classes following the American displacements rather than the English or Continental groupings.

A feature of the Nationals was the International class events: FAI gas, Wakefield rubber and A.2 towliner. In the first mentioned, the Mahieu "Kiwi," a favorite in South Africa, was well to the fore and no less than 26 of them were entered in competition with two examples of Silvio (second place, World Champs, 1954) Lanfranchi's "Swiss-Miss." Most popular motor was the K&B Torpedo .15, although the German Webra Mach-1 came in for a favorable comment. Standard of flying was high despite a very strong wind. Results were: first, G. Bindon (Swiss-Miss) with 799 sec.; second, M. Malherbe (Kiwi); third, P. Visser (Swiss-Miss); fourth, R. Rowe (Kiwi). All used K&B .15's.

In the Wakefield event, after a bad start, Visser pulled three maximums to win with 724 sec., followed by Rowe, Du Toit and Lewis. Winner and fourth man used Dunlop rubber; others used Pirelli. All flew original designs. Nordic A.2 saw another win for Bindon with 726 sec., followed by Rae, Visser and Boys. British kit and magazine designs were popular in this event. In the open rubber event, Visser flew a two-year-old Bilgri "Duster" into first place and thus also won the Free Flight High Point Shield.



Aircraft version Tri-ang receiver in a polystyrene case has polarized relay and DL.68 tube.



The British Tri-ang Radioslave, self-contained receiver and propulsion unit for marine usage.

In the controlline sphere, despite fading interest in the classic speed model, the highlight was Hydenrych's 152.8 mph with a Mac .60 powered job in Class C-D, the first time that 150 mph has been officially topped in South Africa. As in Britain, team racing draws more recruits than pure speed, while combat rivals the popularity of stunt. The Torpedo .35, incidentally, is becoming the favorite for combat in South Africa.

Monte Malherbe became South Africa's 1955 National Champion by obtaining a second and third place in C/L and three second places and a third in free flight. Next year's Nationals are to be held at Johannesburg.

England—New "Tri-ang" RC

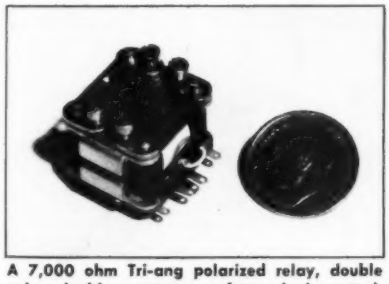
Some details of the new Tri-ang RC components have now been released. Of first interest to aircraft enthusiasts is the Radiomaster transmitter. This is built in two versions. Mk.I (3D6 tube) is tunable but the incorporation of a pre-set absorption wavemeter permits frequency to be accurately set to the center of the waveband. Mk.II (3A5 tube) is aimed at the U. S. market and is crystal controlled at 27.255 Mc/s. Crystal is a U. S. Hunt H.C. 61. The most interesting point about these units is that in addition to emitting an unmodulated carrier wave, they can, alternatively, put out a pulsed signal, the pulsing being achieved purely electronically; i.e., no mechanical interrupter gear is used. Both the pulse rate and the mark-space ratio of the signals can be varied. These transmitters operate on a 90 volt dry battery supply.

The receiver is a single hard-tube (D.L.68) super-regenerative detector with separate quench transformer. Printed wiring (silver) is used. It is made in two models, known as the Tri-ang Aircraft Receiver and the Tri-ang Radioslave. The former comprises receiver and polarized relay housed in a polystyrene case. The latter model is mainly for model boat work and also incorporates a small electric servo motor and can be used for steering models of any size, or for steering *and propelling* smaller boats. It will give either a three-position sequence, or a progressive rudder control. This self-contained unit, incidentally, will be available in a ready-to-run model cargo boat, "British Adventurer," which has three rudder positions, variable speed, plus stop and reverse.

Also available separately will be the polarized relay used in these sets. This component has an interesting specification. It has a coil resistance of 7,000 ohms and is a double pole type. Two sets of contacts provide extra safety in standard rudder-only models. Alternatively, it may be used to provide a secondary (delayed) control via an electrolytic condenser or to actuate reversible servos.

All-India Aeromodelers' Assn.

We have lately received a copy of the All-India Aeromodelers' Assn. 1955



A 7,000 ohm Tri-ang polarized relay, double pole, double contacts: safety, dual control.

Handbook from that organization's tireless Secretary, K. L. Roy. The Handbook and the various National rules contained in it are patterned after those of the British SMAE, but the work that has gone into its preparation and the organizational work of the AIAA is clear for all to see and reflects great credit on the AIAA executive council. It is obvious that this worthy body takes its tasks very seriously indeed. We have contact with many organizations in many parts of the world and seldom do we find, even in the most industrialized countries, evidence of such painstaking efforts by national societies on behalf of their members.

The AIAA rejoices in the patronage of His Highness Maharaja Sir Pratap Chandra Bhanj Deo, G.C.I.E., of Mayurbhanj, and in two illustrious vice-presidents, while the membership of the executive and (*Continued on page 36*)

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- Cannot damage crystal or transmitter when used without antenna. (Helpful in bench testing.)
- Each transmitter pre-tested before shipment.

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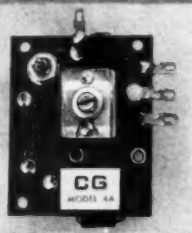

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- Light weight—1½ oz.
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Foreign Notes

(*Continued from page 33*)

technical councils positively bristle with technical qualifications. The Association has a free insurance scheme and a library and workroom which are open to members all the week. Every year an international event is held under the title of the All-India Model Aircraft Rally. Some very fine and valuable cups and trophies are competed for in all classes from Jetex to RC.

Czechoslovakia vs. England Contest

Through the good offices of Radoslav Cizek of Kladno, Czechoslovakia, an international A.2 towliner contest was arranged last February between the Kladno Club and the British Wallesey Club. The event was "decentralized"; i.e., each club flew off its part of the contest in its own country, but weather conditions, fortunately, were similar at both locations. So far as we know, this is the first time that East and West have been matched in the contest field.

The event is noteworthy because of the extreme closeness of the results. Hannay of Britain, with 813 secs out of a possible 900 secs maximum, beat Czechoslovakia's Harapat by only 2 secs, while only 7 secs (0.25 per cent) separated the British team's win from the total of the Czech team.

England: Interesting Twin-Diesel

Lt. Col. H. J. Taplin, well known British RC enthusiast and designer of the original "Radio-Queen" on which the E.D. Channel-crossing model was based, has a number of interesting twin-cylinder Diesels which have been developed over the past two years. These engines are of the in-line alternate-firing type and have been built in .24 cu. in. and .29 cu. in. displacements. Our photo shows a .29 version which we recently had on test. Running is very much smoother than with single-cylinder Diesels of similar displacement. A pulley is fitted in front of the prop to facilitate starting, although we found hand starting quite easy, nor was it at all difficult to get the individual compressions synchronized.

A most interesting feature of the engine is the crankshaft design. In this, in order to retain solid conrod eyes, a two-piece shaft is used, but the section carrying the two crankpins is in one piece to eliminate any possibility of backlash and drive is then conveyed to an extended section carrying the prop drive disc. Intended for RC, the engine is at its best when turning 12-14 in. dia. props at 5,000-7,000 rpm.

Col. Taplin is now engaged on the construction of a four-cylinder motor of similar design. Limited production of these engines may be undertaken if demand appears to warrant such a course.

Australia: Contest Notes

Australia recognizes three team race classes: A, B and C. In the 1955 Australian Championships, which, as previously mentioned in FN, were run off at Mallala RAAF station in South Australia, Class C was won by Mac Munro using an American Anderson Spitfire .64 motor . . . Free Flight experts report a trend toward high-thrustline layouts . . . Most popular at the Championships on basis of contest entries were: gliders, combat, .15 cu. in. FF gas and class B TR in that order.

Japan to Manufacture RC Gear?

We hear from the Ogawa Model Manufacturing Co., makers of the noted OS engines, that they are engaged in RC experiments and in constructing various RC components. It seems probable that this is a preliminary to the manufacture of Japanese RC gear. The low cost of labor in Japan suggests that, as with engines, price levels will be lower than those of the U.S.A. and Europe.

END

Diamond Back

(*Continued from page 21*)

have three hours to work tonight, you can fly tomorrow: 1-sheet medium hard balsa 1/16 x 3 x 36 in.; 1-balsa strip hard 1/8 x 1/8 x 36 in.; 1-balsa strip hard 1/16 x 1/8 x 36 in.; 2-balsa medium hard blocks 1 x 1 x 1 in.; 1-length 1/32 in. steel wire; 1-sheet Japanese tissue; Approximately 14 ft. of 1/8 in. flat T-56 rubber; 1-9 in. prop blank or Pawlowina prop; 1-small bottle clear dope; 1-small tube cement; Some scrap 1/8 in. sheet balsa and enough scrap 1/16 in. plywood to make two 1-1/4 in. diameter wheel discs; 1-Ball bearing washer; Home mixed rubber lube recommended 3 parts green soap to 1 part glycerin.

To start construction, carefully measure 16 in. on the 1/16 in. sheet and square a line across the sheet at this point. Cut across the sheet on this line. From this piece of 3 x 16, cut four lengths 3/4 x 16. These are the four fuselage sides. Assemble these four sides to conform with the cross-section A shown on the plan. Assembled, you should have a square tube 3/4 x 3/4 x 16.

Next, trace the top and bottom profile pieces, rudder and sub-rudder from the plan onto the 1/16 sheet, being careful to note the direction of the grain of the wood shown on the plan.

At this time the landing gear should be bent to shape from 1/32 in. wire and mounted at the point shown on the plan. When the cement becomes dry enough to handle, carefully sand the square corners of the fuselage off a 45° angle to make a flat base on which to mount the top and bottom profiles and sub-rudder. Set the rudder aside until the stabilizer is constructed, then mounted together.

Cut two bands of cotton gauze, silk, or nylon 1/4 in. wide and long enough to wrap around the nose and tail sections of the fuselage and cement in place as shown on the plan. Cut two more pieces approximately 1/2 in. wide and 1-1/2 in. long to reinforce the landing gear and cement to the fuselage. Now you may cement all the top and bottom profile pieces along with the sub-rudder to the fuselage. The wing mount is made from a piece of 1/16 in. sheet with the grain running spanwise. Dimensions are not critical; make it wide enough to prevent the wing from tilting after the initial burst of power when the plane is released. The dimensions are not critical for the triangular pieces supporting the pylon and the stabilizer. Pieces on the original model were made from scrap trailing edge material. Cement hardwood dowel hold-downs for the wing to the pylon at this time.

The nose and tail plugs may be either hard block balsa or built up cross-grained from sheet balsa. Fit the insert part of the plugs to the inside opening of the fuselage first, then carve and sand to compare with the view shown on the plan. Drill a hole in the nose plug for the propeller shaft. Make two washers with small prongs bent at right angles from tin can stock and cement these firmly to the front and rear of the nose block, pushing the prongs into the wood. These washers act as bearings and prevent the hole from being unduly enlarged.

Since Diamond Back is wound from the rear with a winder, the rear wire hook must be firmly embedded in the tail plug. Details pertaining to the correct method of bending this hook are on the plan.

The wing and stabilizer are built flat right over the plan in the conventional manner. As only the left panel of the wing is shown on the plan, the right panel must be traced from it and turned over to give the true picture of the whole wing. The stabilizer is shown full size, superimposed over the left wing panel in dotted lines. These two parts should offer no difficulty whatsoever. Pin the

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leading and trailing edges to the plan, add the ribs and tip pieces, cut the correct bevel on the tip of the main spar and cement in place. Join the two wing panels at the center and block them up to the correct dihedral angle shown on the plan and add the hardwood gussets. The 1/16 in. sheet bottom at the center section is made in four pieces, traced directly from the top view of the wing plan. Cover both wing and stabilizer on both sides with Japanese tissue and watershrink; then, when they are dry and tight, give two coats of *thin* clear dope. If the wing and stab show any tendency to warp during the covering and doping process, by all means fasten them to a flat surface to dry with pins and rubber bands.

After covering and doping, slip the rudder into the slot in the center of the stabilizer between the ribs and cement solid. When this is dry, mount the tail assembly solidly to the stabilizer mount making sure of the alinement. The wing is held to the pylon by three 3-in. rubber bands of the office variety, looped twice around the hold-down dowels.

The wheels are made from 1/16 in. plywood, two discs 1-1/4 in. in diameter, with a facing of 1/16 in. sheet balsa on each side. The bearings at the hub can be either 1/32 in. metal tubing or washers cemented to each side.

The most efficient propeller that I have found for this airplane is a 9 in. diameter, one-bladed folder, as shown in the photographs. Other combinations of propellers and motors are as follows:

9 in. machine cut, two-bladed folder with 10 strands of 1/8 T-56; 9 in. machine cut, free wheeling with 10 strands of 1/8 T-56; 9 in. Pawlowina (hard wood) free wheeling with 12 strands of 1/8 T-56; 9 in. Pawlowina two-bladed folder with 12 strands of 1/8 T-56.

To make Diamond Back almost indestructible, give the fuselage and the raw wood parts two coats of thin clear dope. Also dope the *inside* of the fuselage to prevent the rubber lube from soaking into the wood and adding weight and changing the balance of the plane. This inside doping is facilitated by a piece of coat hanger wire with a cotton ball fastened onto the end and used as a swab. After each day's flying, you may remove the nose and tail plugs along with the motor and run *lukewarm* water through the fuselage to wash out the excess rubber lube. Follow by pushing a balled up facial tissue through the fuselage to dry it.

All parts assembled, flying instructions are in order. First, hand glide. If the plane noses up, add small shims under the trailing edge of the wing at the pylon. If the plane noses down, add shims under the leading edge of the wing. When a flat fast glide is achieved, you are in business. With the aid of a water kettle, steam and bend approximately 1/8 in. wash-in into the right wing; in other words, bend the trailing edge of the right wingtip down at the tip. Do not touch the rudder or stabilizer for adjustment. Now with a small sanding block sand the portion of the fuselage just behind the nose plug at a slight angle downward to give approximately 1/32 in. downthrust to the propeller shaft. These are the extent of the adjustments used on the original airplane; however, they may vary slightly with the use of different grades of wood.

Lubricate the rubber motor well and wind about 50 turns *with a winder* for your first flight. *Do not* launch directly into the wind. Launch the plane slightly upward, to the left of the oncoming wind. It will climb in right circles of approximately 100 ft. diameter and glide in the same direction. Use the rudder *only* to adjust the circles more precisely. After a few low-powered test flights and adjustment refinements, wind up your Diamond Back to full power and be ready for a long chase. Best of luck and good flying! END

Whirling Wings

(*Continued from page* 10)

reason, the high-torque model, which feeds more of its power into the high-drag, high-inertia main rotor system, is usually outclimbed by the short-stroke, glow-engined ship.

Much of the enjoyment to be gotten from flying unorthodox models such as helicopters comes from matching wits with the machine and in learning how to correct its design faults and how to trim it for desired maneuvers. Proper attention to the weight, lift and power problems will insure that your 'copter has the performance to enable it to climb readily and thereby give you the opportunity to observe its stability, gust reactions, and so on. Plenty of deviation from steady, straight climbs or stable translational flight is nothing unusual and does not necessarily mean that any drastic design or trim changes are called for. Individual models differ so widely as to make it impractical to attempt to cover every possible eggbeater aberration in an article of this sort, so we plan to touch on the basic stability problems and let the modeler's common sense take over from there.

To get the feel of helicopter flying, we suggest that the modeler first try a model along the simple lines of the XH-5. You will note that the rotor hub engine mount does away with the need for geared transmissions, provides complete accessibility, and allows a flexible coupling to be used between the fuselage and rotor. Several full sized helicopters have used this same idea, and some years ago MODEL AIRPLANE NEWS published a design by Len Mueller that also employed this torque-reaction principle. To this arrangement Roy Clough, Jr. has added the feathering rotor, and the result is an inherently stable system and one which readily adjusts itself for autorotation after the power cuts.

In hovering or climbing flight, the effect of the forces acting on the feathering rotor sys-

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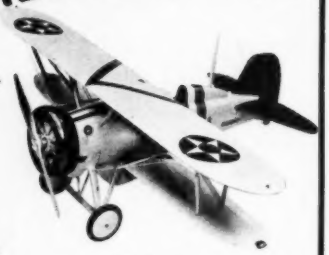

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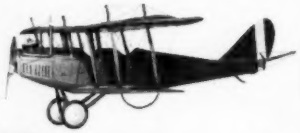

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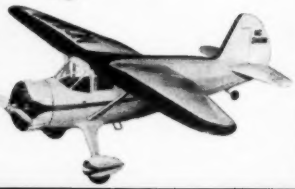

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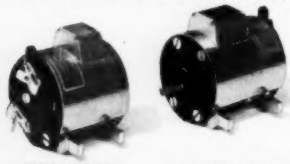

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tem is such that the blade tip weights tend to move up into the rotational plane of the blades and hub, with the result that the blades assume a positive pitch angle. When a disturbing force, such as a gust of wind, tilts the rotor assembly, the inertia of the lead weights causes them to change the pitch of the blades momentarily, increasing the pitch on the low side and decreasing it on the high side, and in this way creates a lift differential which serves to right the model. Forward flight, circles, and other forms of translational flight, such as are required of Hiller Competition helicopters, are what put our crafts' stability system to the real test.

To induce some forward speed in our model, let us add ballast so as to move the CG forward just a trifle. As soon as we do this, we find that the rotor picks up in efficiency, by reason of the greater volume of air which now passes through the rotor disc in a given time interval. Note that engine power output has not been altered. If the added lift resulting from forward flight should result in an increased rate of climb, we don't mind too much, but if this condition should tend to unload the rotor and thereby allow it to speed up, we may be getting into trouble, for if the rotor speeds up sufficiently, it will lose its capacity to compensate for disturbing forces. The usual result of this situation is a nose-dive. Ordinarily this maneuver isn't a laughing matter, but one of our experimental models made it seem so on one occasion, by nosing over into a small tree where it hung by the main rotor while the engine screamed and sprayed out chopped leaves for a full minute.

A great many different forces are acting on the various parts of a helicopter during forward flight and it is not an easy matter to deal with so many variables. Even full scale helicopters tend to be unstable during horizontal movements, so our model problem is not unique. It is probable that most of the difficulty with model 'copters can be traced to fuselage drag; the center of resistance is so far below the CG that forward motion is bound to create a large nose-down moment. For this reason, forward speeds are never great and the permissible rate of motion laterally is so limited as to go undetected where wind drift occurs.

The slipstream of the small propeller may exert a torque upon the fuselage of torque-reaction helicopters, depending on the shape and size of the fuselage. Where this torque is present, objectionable spinning of the fuselage occurs during vertical ascent. During forward flight, the fin is able to cancel out this rotational force. The use of a tail rotor to provide a counter-torque is realistic and mechanically simple, but gives rise to weight and structural problems. Fuel seepage past the rotor mast bearing is particularly troublesome. It seems advisable that one ought to start out with the simple, ultra-light fixed fin and tail-boom arrangement such as is used on the XH-5. Spin control is managed by offsetting the fin in the manner indicated on the plans.

After the engine cuts, the feathering-rotor 'copter settles promptly into a steady autorotative descent; the rotor continuing to revolve in the same direction as under power. The center of pressure on the blades having moved aft, the pitching moment of the tip weights is overcome and the blades now assume a slight negative angle. Very little, if any, blade twist (for "true pitch") is employed on the rotors of full scale helicopters and none at all is required on the blades of torque-reaction models. For the Jetex helicopters, which derive all of their lift from one large pair of rotor blades, about 6° of wash-out is advisable.

Construction Notes

The gimbal mounting for the propeller of XH-5 is a definite aid to stability, and should not be overlooked. Form the fitting accurately in order to minimize prop vibration, and be sure to use a nail, not a machine screw, for the prop pivot. Safety first! Very little practice will be required to catch on to flipping the floppy prop. The wire attachment fittings for the blades serve a double purpose in that they not only hold the blades clear of the slipstream but also provide such structural flexibility that blade breakage seldom occurs. The heavy wire rotor mast should be well anchored in the plywood pylon core, as shown on the plans, and care should be taken that no cracks are left in the pylon area for fuel to seep into.

When testing the XH-5 'copter, adjust the CG position for vertical flight (per plans) and use short engine runs; no more than fifteen seconds. Helicopters have a way of climbing to 100 ft. or so before they show any decided tendency to nose over or spiral dive, should they be so inclined, and we have found it best to keep initial flights brief while a careful watch is kept for any hints of instability. It's wise to put your name and address on your model before testing progresses to the point where full tanks of fuel are used, for good 'copters can climb to better than 1,000 ft. on a normal sized tank and autorotative descents can be surprisingly slow.

Jetex Helicopters

Jet helicopters powered by any of the various Jetex solid fuel engines are quite simple to build and fly, and the JH-3 design is no exception. Use of the skewed hinge mounting for the rotor blades, together with separate boom supports for the engines, results in a rotor system that is exceedingly stable under power. When the jet thrust ceases, the kinetic energy of the Jetex engines keeps the rotor turning at a good rate while the blades flap up into autorotative position. In this position the outer portions of the blades are inclined at a slight negative angle

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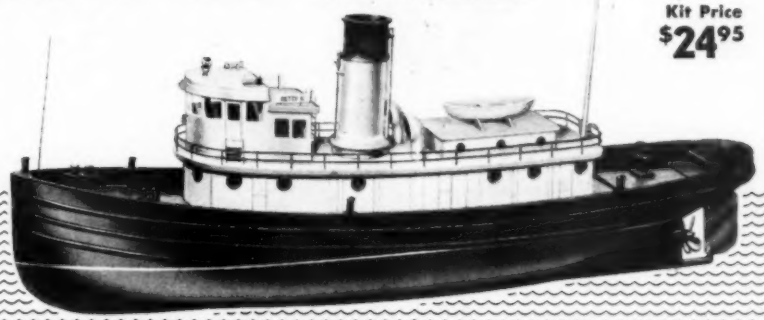

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relative to the theoretical rotor plane, and rotor rotation becomes self-sustaining. The JH-3 model descends very slowly in autorotation, and is quite capable of doing a little thermal soaring under the proper conditions.

With respect to duration, Jetex 'copters naturally cannot compete with gas-engined models, even though the former have superior autorotative qualities. Where the heavy, multi-charge engines such as the "350" are used, motor runs can be as much as 24 to 36 seconds. Only moderate rates of climb are possible with the "350" and its smaller companion unit, the "200." The Jetmaster "150" or the powerful new Scorpion "600" should be used where snappy performance is required. To keep down rotor vibration, always light both Jetex fuses simultaneously.

END

These Engines Were Different

(*Continued from page* 13)

lugs on the engine crankcase. Also available for use with this motor were two-blade and three-blade metal props.

The Burgess was rated, by the makers, at 1/2 hp at 3,500 rpm, but this was a purely nominal rating since, at such low speed, this figure, in actual brake-horsepower, would call for a brake mean effective pressure in excess of 120 lb./sq. in.: more than can be expected from a model engine of this type, even when allowing for the inherently higher bmep of the four-cycle motor.

The design of the M.5 was actually based on full scale practice, the engine being quite closely scaled from the 85 hp LeBlond 5D five-cylinder radial. Such items as the separate lubrication system and twin-magneto ignition of the LeBlond were omitted but, in many other respects, the M.5 follows the prototype accurately. The method of induction, using a crankcase manifold with pipes leading to the cylinders, was similar and, of course, the M.5 employed the connecting rod arrangement common to radials in which there is a master rod running directly on the crankpin, the other rods being coupled to it. The carburetor had two needle-valves, one controlling a slow-running bypass jet. A butterfly type throttle was fitted.

Since a motor of this type involves the use of two extra shafts running at different speeds from the crankshaft, for the purpose of operating valve gear and ignition timing, the M.5 had a quite elaborate gearcase attached to the rear of the crankcase. The main shaft of this was provided with a pin drive from the crankpin and, through a train of gears, drove, first, the distributor shaft at half speed and in the opposite direction to crankshaft rotation and, secondly, the three-lobe cam operating the valve gear at a further 3:1 reduction and, of course, in the same direction as the crankshaft. Cam followers were inserted around the periphery of the gearcase flange and 3/32 in. diameter carbon-steel pushrods with ball ends transmitted motion to the valve stems via diecast alloy rockers. Bronze valve seats were used.

The M.5 crankcase was diecast aluminum alloy and smoothly finished, particularly on the inside. It had a wall thickness of 1/8 in. Two ball bearings supported the crankshaft and were carried in a housing inside the crankcase nose and braced to it with five integral webs. The shaft itself was conventional, being counterbalanced with a machined-on counterweight. The cylinder barrels were diecast, complete with heads, the combustion chambers being hemispherical with each valve inclined at 25° to the cylinder axis. Champion V-3 spark plugs were fitted horizontally in the backs of the heads. The cylinders had shrunk in steel sleeves and a very unusual departure from normal practice was the use of close-fitting aluminum pistons without rings. Some M.5's were understood to have oil grooves in place of rings, but on the example we examined internally, plain pistons were fitted.

The M.5 was not the sort of motor that could be stripped and reassembled in 10

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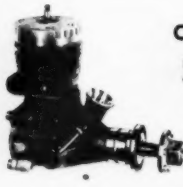

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minutes. There were, for example, a total of 30 screws around the cylinder flanges and 9 screws holding the gearcase to the crankcase. No less than 9 small screws, too, were used to secure the small cover on the back of the gearcase and there were a hundred separate parts in the reciprocating valve gear alone! All this, however, combined to make an engine of considerable interest and of immensely impressive appearance, especially when viewed from the back. It was, and still is, worth owning if only to use as a showpiece.

Other four-cycle engines for model aircraft use which reached production have been very few. Early in 1940, the Feeney, which was made in Chicago, was put on the market. This was a single-cylinder pushrod overhead-valve engine made in three models, of 1.2 cu. in., .92 cu. in. and .60 cu. in. displacement, and known, respectively, as the Feeney models "A," "B" and "C." It had a separate oiling system and a simple air control on the carburetor with no adjustable needle valve. The timer and valve gear drive were taken from the rear, open pushrods operating the valves via rockers and hairpin valve-springs.

Probably the most advanced miniature four-cycle motor to be marketed, however, was the more recent Jensen C. I. Special. Made in quite considerable numbers in a small modern factory in the (British) Channel Islands, by J. & G. Jensen, Ltd., this fine motor had regrettably little publicity and all too few model aircraft enthusiasts knew anything about it, as a result of which the manufacturer was obliged to withdraw it for lack of adequate sales. Despite its exceptionally high quality, the motor was astonishingly low-priced (particularly so for a European product) and sold complete for ten pounds Sterling (approximately $28). When production ceased, the manufacturer's remaining stocks were purchased by a firm in the north of England which subsequently sold most of them in the U. S., but all stocks are now completely exhausted.

The Jensen was exceptionally well engineered in every way. The rockers, for example, were case-hardened throughout and ran on eccentric bronze bushes for tappet adjustment. The camshaft, which was above and at right angles to the crankshaft, was driven by a pair of spiral gears of steel and gunmetal. The cams were carbon steel, were accurately ground on working surfaces from master cams and operated on flathead tappets hardened and ground. The carburetor had an accurate barrel type throttle and the jet had an automatically controlled compensating needle which allowed more gasoline through the jet as the throttle was opened. The exceptional speed control which this gave could only be compared with that of a full size internal combustion engine.

Like the Burgess, the Jensen was based on full-scale engine design, rather than on standard model engine practice, and showed a close affinity to typical overhead valve motor-cycle engine design. The overhead valve gear was entirely enclosed by a rocker-box mounted on the cylinder head and push-rods were enclosed in tubes between this and the camshaft housing. The timer points were mounted on the left hand side of the camshaft and were adjustable for advance and retard. A magneto, in place of the usual coil a. l battery system, could be supplied, if desired.

The C. I. Special ran on straight gasoline, there being a separate oil tank fitted at the right hand side of the crankshaft housing. A cross-hole in the shaft drew oil from this into the bearings, etc., by crankcase depression. Normally supplied with a 6.5:1 compression-ratio, for operation on gasoline, the Jensen could have this raised to as much as 13.5:1 to obtain increased output on alcohol fuels. No sluggard, the motor peaked at 10,000 rpm, giving an output of 1/2 hp and was claimed to run up to 20,000 on a flywheel. Bore and stroke were .937 x .875 in., giving a displacement of .604 cu. in.

Next to the single-cylinder, two-cycle motor, the two-cycle twin has received most attention. Most of these have been of the flat or horizontally opposed type in which both cylinders fire simultaneously, but one or two upright in-line, alternate-firing twins have appeared from time to time. One of the first to be marketed was an alternate firing twin by Southern Model Engineers at Nashville, Tenn., in 1938. It was not a big motor, having a bore and stroke of .625 x .531 in., giving a total displacement of .326 cu. in. The motor was of the standard side-port type, the carburetor being placed at the side between the two cylinders and immediately below small exhaust ports. The distributor was positioned at the back of the case.

A much more recent alternate firing twin and one which is, in fact, in current production, is the Pal .55, made by Pal Engineering of 53 16th Ave., S.W., Cedar Rapids, Ia. This is a rotary valve engine of .55 cu. in. displacement (.750 in. bore x .625 in. stroke) and is now being fitted with a special throttle-equipped carburetor said to give progressive control from 20 per cent to full revolutions. Supplied with the motor is a special metal cowling to assist cooling of the rear cylinder which, in standard installations, will otherwise tend to overheat through blanketing and heat-transference by the front cylinder. Unlike most twin and multi-cylinder jobs in the past, which have relied mainly on novelty appeal, the Pal is more of an attempt to compete with high performance single-cylinder motors and Paul Lebeda of Pal Engineering tells us that outputs ranging from .9 bhp to 1.2 bhp have been reached with these engines and that operational rpm are up to 15,000.

The Pal .55 has a strong one-piece crankcase in which the alinement of the main bearings is assured (a most important point in the design of a twin) and individual cylinders, having a common exhaust stack added, are bolted down to this. The crankshaft, which is chromed, is in one piece with large bearing areas, the crankpins being 3/8 in. dia. Connecting rods are tubular special alloy. Pistons are of a relieved lapped steel type. Cylinders are machined from solid bar stock and have extra cooling fins at the top where greatest heat dissipation is needed. The main bearings are high-speed bronze with a ball bearing thrust.

The Pal .55 can be obtained with glow plug ignition or, to special order, with spark ignition. It may also be had in a marine version fitted with water-jacketed cylinders and a flywheel. Planned is a new four-cylinder, horizontally opposed type engine, the Pal .110. Basically it will be two .55 type cylinder assemblies on a common crankshaft, giving a total of 1.1 cu. in. piston displacement. An additional attraction of this engine is that it will be available with a reduction drive to the prop. Like the .55, the .110 will also be built in a marine version to special order. Present prices are $64.50 for Model 55CG air-cooled two-cylinder with throttle control, $100.00 for marine version and $115.00 for Model 110 air-cooled four-cylinder with throttle control.

Of the many two-cycle flat twins that have appeared over the years, the Elf Twin and the OK Twin, besides being the smallest and largest respectively, are two that have been most widely known. Both were in production before the war. The Elf, of course, is still available, but Herkimer had not listed the OK Twin for the past two years.

The OK Twin had a bore and stroke of .900 x .950 in., representing a displacement of just over 1.2 cu. in. It was for radial mounting and weighed 23 oz. The carburetor was mounted below the crankcase and branch pipes led out to each cylinder, induction

being via standard piston controlled intake ports. The motor was rated at .5 bhp at around 5,600 rpm. It could turn an 18 in. or 20 in. diameter prop.

The original Elf Single appeared about 18 years ago but was later extensively modified and then made, successively, in twin, four and six-cylinder sizes. The .198 cu. in. Twin and .396 cu. in. Four have claimed most attention. All use a .468 x .562 in. bore and stroke, with a single carburetor. Exhaust ports are directed downward and spark plugs are fitted, inclined, in the backs of the cylinder heads. Plain main bearings are used and a bronze strap type connecting rod bearing is used at the crankpin end.

All Elf engines run on either spark or glow ignition. Balanced reciprocating parts make for smooth running. Aluminum is used for cylinders, with thin hardened steel liners. The glow plug models cost $21.50 for the Twin and $45.50 for the Four; Ignition, $3 and $4 additional, respectively. Elf Engine Co. is located at 1526 21st St., Milwaukie, Ore.

One of the biggest four-cylinder motors ever built was the pre-war Condor. This looked rather like four Brown Juniors put together and, in fact, its bore and stroke were the same as those of the Brown: .875 v 1.00 in., giving a total displacement of no less than 2.4 cu. in., or about 40 c.c. The motor had a three bearing shaft, ball bearings being used and crankcase induction was from a single carburetor. Two sets of timer points were fitted and each supplied a pair of simultaneous sparks to opposing cylinders. A two-cylinder version of this motor was also made.

A more modern design of the same displacement came into our hands about three years back when MAN's Ted Martin, then with Anchor Motors, Ltd., the original manufacturer of the British Amco engines, sent the writer a prototype two-cycle 40 c.c. flat four that he had produced, the idea being that we should test it and then proceed to "hack it about" in search of more performance. Unfortunately (or fortunately) we ran into trouble with a bearing picking up and were thus relieved of the responsibility of the latter operation. Designed for RC target model work, rather than for normal amateur use, the motor originally had a fuel injection system direct into the crankcase. Later, however, standard Amco needle assemblies were fitted to the two intakes. The motor had four sets of points, operated, in pairs, from the front and rear ends of the crankshaft. Only two of these were in operation at any one time, the other pair being used to provide two-speed control. Opposing pairs of cylinders were fired together, there being two twin spark coils. Later the engine was modified to magneto ignition and a single carburetor fitted.

During the late 'forties, a number of two-cycle twins of around .60 cu. in. displacement appeared. These included the Wasp, Super-Wasp, Scout, Vivell and Viking. The Wasp and Scout were much the same engine. Both had rear rotary valve intakes, .740 x .702 in. bore and stroke (.604 cu. in. displacement), and shelf-type mounting. The Super-Wasp was bigger, stroke being increased to .750 in. to bring displacement up to .65 cu. in. and had radial mounting lugs. It was a clean and compact looking job with the plugs in the backs of the heads and the cylinders directly opposed instead of being offset in the usual manner. A .75 bhp was claimed for this model.

The Vivell Twin had a bore and stroke of .726 x .687 in. and was distinguished by rather large diameter fins on the cylinder barrels. It had a rotary valve in the rear main bearing and a four-point radial mount. Another twin of this period was the British made Craftsman-Twin. This had a bore and stroke of .750 x .688 in., displacing .607 cu. in., and weighed 15 oz. It used a rear mounted disc induction valve and rear

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mounted timer. It was very compact—only 4.9 in. across the heads—and had inclined plugs in the sides of the heads. The Craftsman-Twin was interesting design but we were never able to extract much power from it. This may have been caused by the fact that the shaft was, in effect, two normal single-cylinder shafts in which the extended crankpins were connected by a bolted-on web. This, in itself, was satisfactory and obviated the need for split big ends, but the whole assembly gave rise to difficulty in insuring perfect alinement of the shaft in its bearings since this also depended on the correct alinement of the split type crankcase castings and end plates.

There have, of course, been numerous "unusual" types of single-cylinder, two-cycle motors. One unconventional type of engine which, nevertheless, achieved popularity was the fine Atwood Champion with its twin rotary valves and, earlier, twin carburetors. No other make, so far as we remember, adopted this layout, although the drum type valve rotor was also used by Dan Bunch's Contestor D.60R and, later, of course, superseded the disc valve in the stunt type Fox .59, all three of which motors we have owned with satisfaction.

When talking of "unusual" designs, a line has to be drawn somewhere as to what constitutes an "unusual" motor. Generally, it is found that an engine with unorthodox features is not one mass-produced in very large quantities. The big exception at the present time is, undoubtedly, the Cox .049 (Space-Bug and Thermal-Hopper) which, with its reed-valve induction and many other unique design features, shows that unorthodox design, when allied to first class construction, need be no deterrent to the wide acceptance of a motor by model builders. END

Spitfire Stunter

(*Continued from page* 18)

and both halves grooved to receive the hinges and elevator horn. These are installed and the halves cemented together. The tin can metal soldered to brass tubing is shoved through a slit in the stabilizer and bent at 90°. Trim flush. If done properly no hinges can be detected when the controls are in neutral; this adds materially to the scale appearance. The preceding points are the only ones that depart from standard stunt construction. Every effort must be made to keep the tail end of the plane light as it can easily become tail heavy.

Silk covering was used but actually is necessary only for the wing fillets. The color scheme is sand, cream with brown added, and spinach, Stinson green with a small amount of black added, topside; the bottom is Cessna grey. The roundels are built up from concentric discs of Trim Film. The lettering is white Trim Film.

The model was sprayed with Speed-O-Lac clear nitrate dope until the pores in the silk filled. This took three to four coats. For the sand and spinach on the top, the whole plane was given two coats of Aero Gloss, Taylorcraft cream. Enough black was added to kill the brightness of the yellow. The spinach was Aero Gloss Stinson green, again with black added. The under portion was Aero Gloss Cessna grey. All trim was cut from Trim Film and clear Aero Gloss sprayed over them after application.

A .29 or .35 engine is used for power and the plane is flown on 60 ft. lines. This plane has many of the characteristics of the full size plane and must be *flown*, not hauled about. Tip losses of the elliptical wing require that all stunts be entered into and departed from smoothly. Once you have felt out this peculiarity, you will be able to stunt with ease.

The scale appearance of this ship is very deceiving. People expect it to fly level! END

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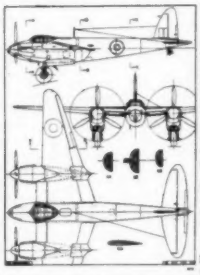

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Flash News

(*Continued from page 7*)

The space ship is not here—yet. But already scientists are serious about instrumentation controls. Objects rushing through rarified atmosphere at thousands of mph will require the most precise instruments known. Even a jet flown on instruments is a hard task. Here are the foremost problems:

Control instrumentation: getting data fast enough on decimal point timing, velocity, height, fuel, etc. Example: Once a space ship is in space, which way is up? If it is orbiting around earth, "up" could be horizontal or vertical.

Measuring speed will be difficult, too. One speed may hold good in outer space. Coming back to earth may make descent rate more important than mph. And, out in space, just how would you measure speed: in relation to earth you've left, the star for which you head, the thrust of the chemical propellant?

Altitude is another sticky problem. What measurement? Feet, miles? Fuel rate of consumption will be fast. Pressurization changes could be fatal. And what about radiation? Science still knows little about the bombardment of cosmic rays which never penetrate earth's atmosphere to any serious degree, but which might atomize a space craft.

We must add our final comment. If the powerplant on a space ship fails, there's no need for a pilot to worry about the ship's falling. It will just remain in outer space. That problem seems solved.

"The plane they will not let die" is a description that appears to fit the C-46. Only now it's the *Super-46*. Orphaned in 1945 when Curtiss Airplane Division of Curtiss-Wright was discontinued, some 400 civilian and military units here and abroad were believed to have passed into limbo. But, not so. Some 26 airlines using them got together, asked Aircraft Engineering Foundation to modify and modernize the plane. The result is a craft with better engine cooling, more power, excellent fire protection, better braking and handling—and a non-stop transcontinental flight averaging 232 mph.

A modernized Ford *Tri-Motor* is on the way (first certified in 1926). The name will be changed, however, to the Stout *Bushmaster*. Hayden Aircraft of Bellflower, Calif. will build it for performing in, of course, the bush, to have the shortest take-off and landing distance, fastest climb rate and biggest payload per gross weight of any transport.

The penultimate (ulp! some word) in instrumentation is what Hughes Aircraft has come up with. All the information a pilot needs is shown on five indicators. Two vertical scopes show speed, altitude. Two circular ones indicate attitude, direction, terrain, weather and collision. A fifth is a circular navigation aid with a moving plane marker plotted over a chart of the mission area.

Add the *Monster* to your aviation dictionary. It's the Navy's new king-size mobile crane that can lift a 30-ton disabled bomber off runways. It also puts the same plane down again, gently enough to crack—but not smash—an egg. LeTourneau-Westinghouse builds it.

The "orchids-to-you" department: To Air Training Command's 3510th Combat Crew Training Wing for logging 13,000 flying hours, 18,250 take-offs and landings of Fairchild's *Flying Boxcars* without a major accident, injury!

A twin-jet executive plane will be pushed by Beech. An old-line French aircraft firm is building the Morane-Saulnier MS 760, but Continental Aviation & Engineering will make the engines—same as those in USAF's T-37. Top speed will be 405 mph, maximum range about 1,000 miles, seat four comfortably.

What Washington's aviation writers gossip about: Warner Bros.' new aviation picture, Toward the Unknown, to tell about test pilots and experimental work on aircraft by AF... Goodrich's new tubeless plane tire that can take the shock of take-off or landings at 300 mph... That Navy's plans for a nuclear plane powerplant is out of design at research, over in BuAir... Army's interest in two-place 'copters for front-line reconnaissance.

The "things we'd like to know more about" department: Britain's radar-missile air blanket covering the United Kingdom, linked to a chain of instantaneous response controls automatically scanning all objects traveling in the air. Final development is supposed to have computers identifying craft as friend or foe. If the latter, the computer trips a switch, sets off action pulses which in turn start firing of ground-to-air missiles closest to the targets, all within fractions of seconds. END

For the RC Fan

(*Continued from page 25*)

blade across the surface. A stone is likely to round the edge and cause the escapement to skip under the full winds. Keep the edges of the pawl and fly arm *flat* and keep the gaps to a minimum (.020 or less) for best operation. In many cases, high pull-in current needed for operation is caused by too heavy a rubber motor. If you are using 3/16 in. flat rubber, try 1/8 in. flat to reduce the friction between the pawl and fly arm. You will find in nearly every case it will still have enough power to swing the rudder except in planes over 4 lb. in weight. (Editor's Note: *Many users of compound escapements have gone to 3/16 in. rubber. On big, fast or heavy ships, it is desirable to use aerodynamically balanced rudders for the compound escapement; if used with 1/8 in. rubber on such ships, proper balancing is essential for air loads may blow back the rudder.*)

After the whistling crack-up mentioned in the first paragraph, the writer simply took a 200 ohm rheostat, taped it to a 5-volt meter with two size C flashlight batteries and darned soon found out what caused the splinters. END

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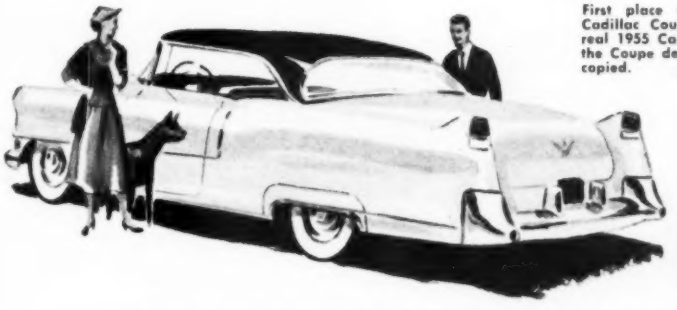

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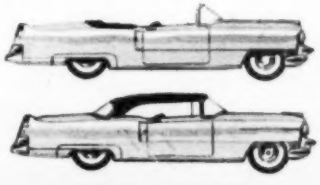

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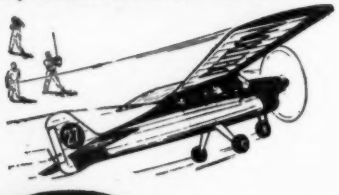

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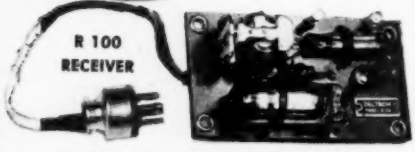

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Free flight was most popular. Highest ukie event, combat, was fourth. The chart sure is a shocker.

'54 NATS BREAKDOWN

Interested in learning which were the most popular events at the Glenview Nationals? Well, thanks to the cooperation of Frank Purdy, who looked after the official records at the biggest-ever Nats, here's a table for MAN readers, which shows at a glance just what the boys were flying.

Significant was the big lead held by FF (103 in ROW alone); the whopping 200-plus entry in HL Glider (only 22 per cent were Juniors); Combat as top CL event; tremendous interest in RC, Nordic Glider—and the ever staunch following in CL Speed, Stunt and Carrier. Indoor flying, although small, continued to thrive. Disappointing were the low number of entries in Clipper Cargo, FF Scale, PAA-Load Rubber and Helicopter—for our money, some of the most interesting events in the entire program. END

	EVENT	NUMBER OF CONTESTANTS
1	FREE FLIGHT GAS — 1/2 A	307
2	FREE FLIGHT GAS — A	272
3	HAND LAUNCHED GLIDER	209
4	CONTROL LINE COMBAT	184
5	FREE FLIGHT GAS — B	154
6	FREE FLIGHT GAS — C	145
7	RADIO CONTROL	132
8	NORDIC TOWLINE GLIDER	115
9	INDOOR H.L. GLIDER	114
10	PAA LOAD GAS — 1/2 A	108
11	R.O.W. FREE FLIGHT GAS	103
12	C/L SPEED — CLASS B	96
13	C/L SPEED — CLASS C	90
14	LIMITED RUBBER	89
15	C/L SPEED — CLASS A	87
16	PAA LOAD GAS — AB	81
17	C/L PRECISION AEROBATICS	79
18	C/L SPEED — JET CLASS	64
19	WAKEFIELD RUBBER	56
20	C/L U.S. NAVY CARRIER	52
21	LIMITED TOWLINE GLIDER	42
22	C/L SPEED — CLASS 1/2 A	40
23	INDOOR RUBBER — STICK	38
24	C/L TEAM RACING	37
25	INDOOR RUBBER — CABIN	25
26	PAA CLIPPER CARGO — 1/2 A	21
27	C/L FLYING SCALE	21
28	F/F GAS — 1/2 A SCALE	15
29	PAA LOAD RUBBER	14
30	FREE FLIGHT HELICOPTER	5

2795 ENTRIES WERE SPLIT INTO: 66% — F/F AND R/C, 28% — C/L, 6% — INDOOR

Pen Pals

▸ A public school model training program has hit a snag for lack of a Campus A-100 CO2 engine. Can you help A. P. Gall, 1109 Cambria St., Portage, Pa. and his 10 to 14-year-old group? . . . David W. Logan, 230 Merion Ave., Haddonfield, N. J., can't find parts for an old Maxey model . . . Swap your Bonner compound escapement, small receiver, Cub .14 for Tiger ignition adaptable to two-speed, DMECO servo, assorted engines with Roger F. George, 3405 17th St., N.E., Washington 18, D. C. . . . David B. Palmer, R.R. 1, New Palestine, Ind., will swap Cub .049B for K & B .02 . . . More engines than we can count and some 250 back issues of aviation magazines offered in trade by Harry A. Gabler, 1016 Fourth St., Weirton, W. Va. Displacements range from .045 to .65 . . . Kit or complete model of Berkeley Bearcat with O & R .23 two-speed will be accepted by James O. Parks, Box 57, Gulin, Mo. in return for assorted engines of .19 to .65 displacement.

Pen pals are sought by: David Meany, 16 Lightcliff Ave., Lindfield, Sydney, Australia, speed, TR, who, with 20 club members, will also swap gear . . . Jim Dishun, R.R. 1, Box 200, Franklin, Ohio, is especially interested in Japanese correspondents . . . English or European pen friends are sought by Joel Gallagher, Box 71, Clearlake Highlands, Calif., scale, history . . . Write to 15-year-old Bernt-Arne Vikstrom, Box 108, Vansbro, Sweden about engines, CL, TR . . . Gerard Spaven, 16 Horton Rd., Rusholme, Manchester 14, England, aged 24, likes jets, CL speed, stunt, TR, combat, scale; will exchange gear . . . WW I craft of special interest to Dave Lundberg, 14, of 165 W. Forest, Arcadia, Calif.

You may have been looking for these: Richard R. Homolka, 2748 S. Millard Ave., Chicago 23, Ill., will sell Sabre 44, OK's, Spitfire, Puddle Jumper and flying wing . . . Several .099's, including four new English Diesels, available from Thomas Alden, 56 College St., Amherst, Mass. . . . Steve Kanyusik, c/o Stephen's Studio, Red Lake Falls, Minn., is looking for old Cleveland kits DWARF CD class and Edward J. Husarik, 1621 Colby Ave., Everett, Wash., wants to sell some old Cleveland kits . . . And yet another request for Book I of the bound Wylam works from Robert A. Becker, 501 W. Michigan, Urbana, Ill. and for the October, 1951 issue of MAN from Lt. Donald W. Bennett, 94th F I S, George AFB, Calif.

MAN at Work

(*Continued from page 6*)

bugged out until we saw 6 in. of daylight between cabin and wing! Someone had a ground control gadget that you plug into any carrier wave transmitter to make it a two-channel job and without tone. Didn't believe it, either, but it works. Two-tube receiver about as big as a Lorenz.

* * *

▸ New Cleveland Balsa Butcher decal from good friend Red Hillegas, Red's Hobbycraft Models. This came about when we asked whatever happened to Dick Korda. Every kid in the country used to know Dick. When his rubber job flew 54 minutes in 1937, the model world went crazy with excitement. In those days, big times were the thing. Burd had a Korda kit, so did Megow, maybe others. But a few years ago Dick found out that a Champion flies like a big gas model and we ain't (pardon, teacher) seen (ditto) him since. "We reactivated the club a few years ago," Red tells us, "with a nucleus of old timers, George Reich, Joe Elgin, Jerry Kolb, Owen O'Malley, Matt Basta, etc. Added a few new ones like Dave Domizi. CBB is mostly a Wakefield group but individually cover everything but speed.

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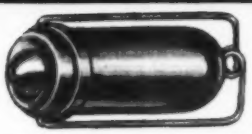
Jet Engine



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Scale flying model of US Air Force's powerful new jet. Features all balsa AEROFORMED* construction for fast, strong assembly. $1.25

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Extra fuel: 6 pellets plus wick .65
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"No officers but Jim Bowers, Sr., a sort of secretary," Red explains. "No regular meeting time or place but get together about once a month. No business, either, but do cover things like Wakefield eliminations. Strictly bull sessions about best rubber, gears or no, long moment arm versus short. The works. Be sure to include the CBB on your list. The best darn club in the world."

* * *

▸ Best located club in the country according to Ken Barbier, Jr., is the AV Airs. The AV stands for Antelope Valley. That's in Californy, takes in Lancaster, Palmdale, Rosamond, Pearlblossom, the Rosamond and El Mirage dry lakes and Edwards Air Force Base. The big aircraft companies thereabouts have assembly and test facilities at Palmdale, where, with few exceptions, older club members work. Started in January, the club has 41 members, has run a hand-launched glider contest, with a free flight club deal coming up. Just to get the swing of things. New members welcome. Meetings every Monday, 7 p.m. Palmdale School, 38334 N. Tenth St., East. Big interests are free flight, RC and some ukie . . . And how's this for a name? Klobber Klub. Harry Jones, Publicity Chairman, RFD 1, Gaitherburg, Md., describes an inter-club 500 lap stock race. This we'd like to hear more about. Sounds real hectic!

* * *

▸ Every time an RC field box picture gets into print, modelers want to know where this thing has been all along, how to get it, etc. So, for the umpty umpth time, the RC field box is made by old timer Jack Billings, Broadfield Air-Models, Cutler Drive, Ashland, Mass. The thing stands almost waist high, has folding legs, compartments and detachable U-shaped brackets to hold the ship ready-to-fly on the field. Billings, incidentally, also makes a big variety of shaped leading and trailing edges with unique spanwise slots to take gussets.

* * *

▸ We've got headaches? You've got headaches? Consider McCoy's. The design displacement of their new .36 is .345, not .354, as the literature on the motor tells the world. Doesn't make much difference? Well, the new AMA rules limit maximum displacement in the combat event to .350! The McCoy .36 is eligible. Please note, you contest directors and modelers. Somebody goofed! . . . When Len Kincaid moved from Philly to Santa Ana, Calif., he found the new church had large basement work benches and the fixings—none of it being used. So Len got together with the Youth Director and within three months they had a group of 30 young boys and a troop of Scouts active in church model plane work. Building on Wednesday nights and Sunday afternoons. There's a gym for indoor meets. Hobby dealers back the club all the way with nice merchandise and trophies. Kids from 8 to 18—we're all kids! So many curious parents came out that both mothers and fathers attend building nights.

Says Len, "I would like to see some good, fighting leaders try this in other localities. I'm sure it would pay off." Amen. END

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☐ SHEIK: .29 team racer.
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SLOWPOKE: .09 sport free flight.

☐ BOUNDER: Record .29 speed.
ZEPHYR: .049 free flight.

☐ NOBLER: Aldrich .29 stunt.
FUNSTER: Hot .049 free flight.

☐ SKY WING: .049 flying wing.
CHALLENGER: .29 team racer.

☐ HOTTER 'N THAT: .29 combat.
SUPER SAUCER: Large towliner.

☐ BEAVER: .19 - .35 scale.
ZENITH: Taibi A free flight.

☐ HALF WILD GOOSE: .049 free flight.
FIRECRACKER: .29 scale.

MODEL AIRPLANE NEWS
551 Fifth Ave., New York 17, N. Y.

Enclosed is.....for which send me postpaid the sets of plans which I have checked.

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Breezy

(*Continued from page* 14)

glide slower, but with the lighter weight it would really dig out under power. It seems incredible, but I actually had to plug the McCoy Diesel down in order to reduce the performance!

There were two possible avenues still open; I could make the model just a little bigger, without increasing the wood sizes in cross-section, and thus come up with a lighter wing loading and heavier power loading; or I could try a biplane design, which I knew would be capable of sharp turns.

As luck would have it, I had a couple of spare panels in my scrap box, left over from an earlier biplane free flight design, the old Duranita. They weren't really designed to fit the job I was flying, but I rigged up a temporary mounting arrangement, covered the panels with silk, stuck the panels in place, and went out to try the idea.

The model hadn't been in the air half a minute before I knew that I was on the right track. For the first couple of flights I took it easy on the button until I got some altitude, but from then on I threw caution to the winds and just had fun. We have a 150 ft. circle which has been leveled off for ROG flights (and landings for those that can hit it), and with a little practice I have been able to do figure eights inside that circle. It is also possible to circle the model up to altitude, wring her out, and then, when the engine quits, circle down almost inside the 150 ft. circle except for straightening out the last turn in order to make a final straight-in glide for the landing.

The addition of the lower wing increased the weight by a couple of ounces, and also necessitated a little more fin area. There seemed to be plenty of excess power, so it now looked as if one more model, designed as a biplane to begin with, would prove to be the final answer. However, by this time, I was just a little tired of building new jobs, so I did the designing and turned the building job over to my good friend Bill Glick. He came up with one of the slickest models you ever saw, except that it was just large and heavy enough to be marginal as a Half-A job, and we finally had to go to a larger engine. Also, when we did that, the model was no longer a truly small field job. It did serve two purposes, though: Bill has a real nice biplane for sport and contest flying, and I found out that the practical weight limit for Half-A biplane jobs is about 28 oz., even though the monoplane performs well at 2 lb.

And thus I arrived at the final design for Breezy, the small field specialist, which permits, as added attraction, that you remove the lower wing, slip a light balsa fairing in the wing cradle, and fly the job as a monoplane.

The name Breezy came naturally: the model is not intended to penetrate a strong wind, but it flies well in a breeze. It uses a Babcock Radio Engineering receiver (BRE) and is easy to build and fly (EZY), which all adds up to BREEZY.

For those of you who are pretty hep to the radio side, and feel that you can set up a really reliable lightweight receiver of the modified Lorenz type, you can lighten the model by about 4 oz. and get it to fly in an even smaller area, but you'd better be sure of that radio. A friend of mine, Brett Page, who works in the laboratories at Hughes Aircraft Co., makes up a sweet little two-tuber that weighs only 1 oz. and with a Babcock 1.0-2.0 relay, a couple of 22-1/2 volt hearing aid cells, two pencells for the A supply and one pencell for the Babcock escapement, we were able to cut down the radio weight by 6 oz. With this equipment installed, Breezy flies around like a control-line job.

The BCR-3 receiver, using the lightweight battery complement shown in the plans, incorporates a slight modification in the circuit by connecting the C-plus to the A-plus. Otherwise, it is standard. A word of caution—check your A batteries often, and don't let them get below 1.25 volts if you go in for long flights.

So much for the background story on the development of this model. Let's get on with the construction. In this regard, one thing is very important to remember; weight can be controlled by careful wood selection, and the lighter you make your model, the smaller the area you will be able to maneuver in.

I have mentioned that Breezy is easy to build. That is, of course, a relative statement, because no radio job is "easy" to build, but some are easier than others, and Breezy falls into this class. It follows the simple, classic, Warren truss pattern in the fuselage, and conventional wing and tail construction. Only a moderate amount of detail construction is shown, because most of you will probably make modifications anyway to suit your own taste. Just don't modify the layout! That is, unless you want to change the flight characteristics to suit your own purpose. If you do, be careful of one thing, particularly if you decrease the angular difference between the main wing and stab settings: watch out for right turns under power if you have your right thrust setting arranged for straight flight cruising, because as the speed picks up in the right turn, the right thrust pulls the nose down, and it can be dangerous.

It isn't bad if you're flying Breezy as a biplane, but if you have removed the lower wing, it can be disastrous if the speed builds up too far. True, you can eliminate this by

taking out some of the right thrust, but then you're faced with the necessity for constant correction of a wide left turn at cruising speed. We'll talk about flying technique a bit later on.

For fuselage construction, follow the conventional procedure. Make two sides, using 3/16 in. square hard balsa for the longerons, 3/16 in. medium hard sheet for the shaped pieces around the lower wing and forward to the nose block, and the various sizes as shown on the plans for the diagonals and upright members. Add the gusset plates at the joints where reinforcing is required, and shape those at the windows as shown.

Join the two sides together with the plywood formers at the landing gear station and the upper wing trailing edge station, then pinch the tail together, cementing it firmly after making sure that you have equal curvature in both sides. Next press the nose sections in until they fit the width of the former which backs up the nose block, and cement. You'll have to use some means of holding the sides in until they dry. I used cross braces at the top and bottom and wrapped rubber bands around the nose until dry.

After you have the two sides together, don't put in the rest of the cross-bracing until you've made up the torque rods, mounted the escapement, installed the torque rods and checked out the operation. This is the time to make sure it works without binding anywhere. Also, have the leads soldered on the escapement. Now you can complete the cross-bracing. No diagonals are necessary in the top and bottom of the fuselage; the silk covering provides all the necessary strength.

The base plate at the nose is carved to shape out of 1/2 in. balsa. It should be medium hard stock, since it gets scraped occasionally on landing. The nose block should be carved out of hard balsa, then hollowed out for lightness, and also to provide access to the mounting bolts for the engine.

The engine cowl is carved out of a balsa block, but it doesn't have to withstand any heavy shock, so use light balsa. Hollow it out so you can lay a Jim Walker balloon tank on the engine bearer back of the engine and then cover it with the engine cowl, which is held in place by a rubber band when the model is flying. The landing gear arrangement is very simple, yet provides a very serviceable gear for light models. Note that the gear is shaped to fit in a slot across the bottom of the fuselage and is held in place by rubber bands wound around the mounting dowel. The dowel serves the triple purpose of providing: (1) a forward bearing surface for the radio base plate, (2) a retaining member to restrain vertical movement of the radio base plate, since the B batteries slide in between the dowel and the plywood former, and (3) the landing gear mounting as well.

Wings and tail surfaces are held in place by rubber bands fitted over 1/8 in. dowels, which shouldn't be mounted until the rest of the fuselage is completed and the two sides have been covered with silk, since this procedure simplifies the covering of the sides. This also applies to the dowel for the landing gear.

Two 1/8 in. dowel rods are also run from the sides of the fuselage at the leading edge of the wing down to the center of the top of the plywood former at the landing gear station. This makes a good strong windshield area, which has proved its worth in a couple of crashes which occurred during the testing program. The "cradle" for the lower wing is formed by cementing 1/16 in. sheet across the fuselage, grain running crosswise.

The wings are very simple. Build them in one piece right on the plans. Then cut the upper wing in two at the center line, trim the center of the leading edge, trailing edge and spars to fit the 5-1/2° dihedral, cement reinforcing hardwood or plywood gussets in place,

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to establish the dihedral, then cover the center section with 1/16 in. sheet. The lower wing is all one piece, with the center section covered with 1/16 in. sheet to minimize holes which may be occasioned by rough landings. Be sure to trim down the three center ribs of the lower wing 1/16 in. at the top so the wing fits snugly, with the 1/16 in. sheet on top of the wing fitting up against the 1/16 in. sheet in the wing cradle.

For stab and fin, too, the construction is straightforward. In fact, if you're the lazy type, you can use 1/8 in. sheet balsa, medium light grade, and make a couple of lightening holes, rather than make the built-up tail. The weight difference is negligible in this case, but I felt that since the rest of the model was built up, the tail should be, too, just to maintain the uniformity of construction. The elevators and rudder are cut from 1/16 in. sheet and attached to the stab and fin with cloth hinges.

You may want to set up your own favorite method of mounting the radio. The removable base plate arrangement which is shown on the plans was designed for quick interchangeability, since I was developing a model and figured that I might have to install the radio in several different versions before reaching the final design. As it turned out, this mounting arrangement is also very serviceable. The B batteries are taped to the base on the under side, then they slide in the opening between the landing gear mounting dowel and the bottom cross-piece of the plywood former; thus the forward edge of the radio base plate butts up against the landing gear mounting dowel, and this fixes the forward end of the radio base plate in place. The rear end of the plate is held in place by a wood screw which is inserted into a 1/4 in. basswood cross-piece which is cemented into position as shown on the plans. For the BRC-3 receiver, the C and A batteries are mounted as shown, and all connections are soldered. Some of you will shudder at this, because of the weakening of the batteries which results from the soldered connections, but as far as I am concerned, I'd rather solder the connections and have the shorter battery life, because it eliminates two other liabilities: the additional weight of battery boxes together with the possibility of poor contacts in the boxes causing a loss of control just when you need it most. However, this is a matter of choice, and if you want to vary the radio mounting, go ahead; just be sure you don't move the CG too far from the spot that it is shown on the plans.

The entire model is covered with silk; paper isn't strong enough, and nylon is too heavy. To keep the weight at a minimum, I used colored silk and clear dope, but if you are one of those radio specialists who can set up a lightweight radio, colored dope can be used because of the weight saving thus accomplished. Just remember to keep the over-all weight under 28 oz., or you'll have to go to a larger engine and also a larger flying area.

Breezy is small enough and light enough to be hand-glided safely. Glide the model and make the usual corrections for noseheaviness or tailheaviness until you get a good, flat, sinking type of glide. Then you're ready for power flight.

The engine thrust line should be set so that, with the glide established as above, a steady climbing flight is achieved under power. Roughly about 5° of downthrust and 3° of right thrust will give you this type of flight. Slight variations will be necessary depending on your own individual model's characteristics, since no two models are identical. The engine mounting base is patterned to give about 3° of right thrust, and you can get the necessary downthrust by inserting some tapered hardwood blocks between the engine base and the beam mount.

First in importance, when flying, is setting up the rudder and elevator linkage to get the right amount of travel in the surfaces. This

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will vary, of course, if you use a Bonner or a Cameron escapement in place of the Babcock. In any event, you'll have to use a compound type of escapement in order to get the simple up-elevator movement from the third position on the compound. The schematic on the plans shows how it works. The Babcock compound escapement comes equipped with bearing holes for the torque rods, and crank arm followers already matched, which simplifies the mounting.

The only way that I know of that will determine the right amount of elevator travel for your plane is to try various amounts of movement until you get enough to give you good elevator action without making the model zoom too much. This can be accomplished by varying the angle at which the follower sets when the crank arm engages it as the crank arm comes down from the second to the third position. I suggest you start with about 10° elevator travel and go from there as experience dictates.

As for the rudder travel, this is a matter of choice also. My own personal preference is for enough rudder travel that a short beep causes the model to go into a turn right away; thus, to make a complete circle, you "beep" the model around rather than hold the button down. This gives you the added advantage of a quick recovery and rapid entry into a turn in the opposite direction. It is true that this causes some "rocking" in the model, but for flying in confined areas you'll need the fast action. About 15° is what I use.

For really sharp turns, the technique is to hold the button down until the model gets well into the turn and the nose starts to drop, then feed in some up-elevator. For example, if you want a sharp right turn, give a single push on the transmitter button, hold it until the nose drops into the turn, then give two quick beeps and hold the second one; this holds the escapement on the third position which is up-elevator, and tightens the turn up very sharply, raising the nose at the same time. Similarly, if you want a sharp left turn, give two beeps, hold the second until the nose drops, then give a quick third beep and hold it. This procedure is very useful when you are gliding in for a landing and want to turn the model without losing too much altitude. Practice it while the model is high in the air, and after a while you'll be able to make approaches like a hot fighter coming in for a landing. You'll find that flaring out for a good landing takes some practice. If you give up-elevator command when the model is too high off the ground, it may stall out and drop in for a rough landing before you can correct it with another up-elevator action. In fact, if Breezy is coming in steadily after a good approach, sometimes the best technique is just to let her land by herself. END

Radio Control News

(*Continued from page 24*)

super-sensitivity of the Citizen-Ship 465 mc receiver is largely caused by the great difference between the quench frequency and the incoming signal. How can you achieve this condition? As was mentioned in previous columns, the primary way is to increase the values of the grid resistor and/or capacitor.

Values of 4.7 meg for the resistor and 120 mmf for the capacitor (5 per cent tolerance) gave definite improvement when checked with 37 different RK-61 tubes. Paul Runge of Ace Radio Control, Higginsville, Mo. ran checks based on this information and reports that he found 5.6 meg and 150 mmf to give improved results. Too large a value for these two components will make for excessive blocking action and the result will be improper operation.

Another cause of insensitivity of super-regen receivers, and one mentioned by Bob

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Beckman of Concord, Calif., is low filament voltage. Since the receiver is in an oscillating condition, the stability is governed by the steady flow of electrons from the filament. When the voltage drops below a nominal value, usually about 1.2 volts, the current also drops and hence the power is reduced. This reduces the electron emission from the filament and the oscillating action becomes unsteady. Hence it is important to maintain your filament voltage, under load, to a value of 1.2 volts or more. We've run tests on RK-61 circuits where the filament voltage was reduced to a low of 1.05 volts and proper operation was maintained by other circuit adjustments, something that cannot be done when the plane is in the air. Incidentally, low B battery voltage will also affect proper operation when it drops, generally, below 40 or 41 volts, from a peak of 45 volts.

Fig. 1 shows the method suggested and used by Ralph Brunson, 10 Elm St., Florham Park, N. J. to determine accurately the percentage of modulation of a transmitter. A pick-up loop consisting of a tuned circuit (High Q), is coupled as shown, through a 15 to 18 in. piece of 300 ohm twin lead, to the vertical deflection plates of an oscilloscope. Some scopes have these connections brought to terminals. In case yours does not, use .005 mf capacitors to couple to the plates and remove the amplifier connections from the plates. A High Q circuit will provide plenty of signal to give good response. With tone work becoming more popular, this should be a boon to the experimenter and designer.

We can't get another "free" band unless you send for your FCC registration. Have you done it?

The Citizen-Ship Radio Corp. is the first manufacturer to offer a suggestion as to changing their particular receiver from 27 mc to 50-54 mc operation. Details on this new band later on. The T and S coils should be reduced to seven turns and the 15 mmf ceramic capacitor across the T coil reduced to 5 or 6 mmf. These changes alone will allow you to operate in the six meter band, *provided* you hold the proper license. Hams should welcome this information as it will allow them to get out of the congested 27 mc spot.

As mentioned before in the column, there is now another possibility for RC fliers to get more planes in the air at one time. The FCC, in May of this year, opened the six meter band of 50-54 mc, to those holding a technician's license. This means that, while 50-54 mc is not a free band for RC, the licensing tests are well within the scope of the majority of fliers. The old bugaboo, code, has been reduced to but five words per minute. The technical exam is standard and those who have been in RC work for a short time should have little trouble, with a little concentrated effort, in passing it. Details on the exam may be obtained from a local ham friend or by requesting the following books from The American Radio Relay League, 38 LaSalle Rd., West Hartford, Conn.; How To Become a Radio Amateur, 50¢, The Radio Amateur's License Manual, 50¢, Learning the Radio-Telegraph Code, 25¢ and A Course in Radio Fundamentals,-50¢.

Obtaining these books will enable you to do the following: get a technician's grade amateur license so that you may operate in the six meter band. By doing this you can fly, along with those on 27 and 465 mc, up to five planes at one time. The six meter band covers 50 to 54 mc and is not a spot frequency like 27.255 mc. Hence, by separating the band into spot frequencies of, say, 50.5 mc, 51.8 mc and 53 mc, no interference will be encountered and harmonic radiation from 27.255 mc is eliminated.

All receivers in use today may be easily converted to six meters and the only thing left to worry about is the transmitter. This must be crystal controlled. In case you want to order your crystal, here is the set-up. Use a third overtone crystal, in a circuit such as is presently used for RC work, and triple to 25 to 27 mc. This is followed by a push-push doubler to place you on from 50 to 54 mc. In other words, to operate in the center of the band, on 52 mc, we must have a 8.666 mc crystal which will triple to 25.998 mc. By doubling this we obtain 51.996 mc. This new set-up will allow the builder to make his own equipment and at the same time offer relief from the congested 27 mc spot. You can also do combat flying and have races. Surely one out of three club members can get a technician's license and then offer the club some novel flying.

NEW ITEMS

The new Sigma 11 relay should be available in about a month. This 1 oz. relay has a 9,000 ohm coil, silver contacts and will close on approximately 1.4 ma, factory adjustment. It is ruggedly built and operates well with any receiver drawing 1.7 ma or more. Excellent for a secondary relay.

The CG R-1 tone receiver we wrote about in the June issue (CG Electronics Corp., 305 Dallas St., Albuquerque, N. M.) is still giving excellent service in a boat, with no adjustments needed to date. The CG transmitter (T-15) and M-3 modulator do a fine job of operating several commercial reed receivers plus a few tone jobs we put together.

Although they have been out for quite some time, if you haven't seen the latest data sheets from Control Research (Hampton, Va.), ESSCO (58 Walker St., New York City), Ace Radio Control (Higginsville, Mo.) and Gyro Electronics Co. (325 Canal St., New York City), be sure to write for them. Besides a listing of standard kits and components, there are special items and diagrams on various installations and gadgets. Handy information to have around for new ideas and they should prove a big help to the many newcomers to RC who have been wanting to know where to buy parts.

If you insist on the ultimate in subminiature components, you'll be interested in, first, the model TSA, SPDT toggle switch and the model TSB DPDT switch made and sold by Miniature Switch Corp., 147 Ocean Ave., Lynbrook, N. Y. The body of the SPDT switch measures approximately 1/4 x 1/2 x 5/16 in.. Precision made, it is capable of handling any current used in RC work. Selling for $3.50 for single units of the model TSA, this is the type of switch that goes into specialized commercial and defense equipment. The second item is a sub-miniature IF transformer, model VO-TRAN T-101. Measuring 1/2 in. in diameter by 5/8 in. high, this unit is used in the Regency transistorized radio receiver. For those interested in super-het receivers for RC work, this is the last word. Made by Vokar Corp., Dexter, Mich.

The Aero-Trol receiver made the Kurman relay famous in the RC field. The new model, with adjustable points and heavier contact arms, is a high sensitivity relay weighing but 1-1/4 oz. and it is available from Kurman Electric Co., Inc., 35-18 37th St., Long Island City, N. Y. Stock models may be had in the following coil resistances: 3,900; 4,600; 7,250 and 10,000 ohms. For the maximum in sensitivity, use the 10,000 ohm model 23CF44, which will close on .8 ma. No prices have been announced. This is a good general purpose relay which will give reliable operation.

The deBolt Model Engineering Co., Williamsville, N. Y. has published a small booklet describing multi-servo actuators (made by the company) in detail. For only 25¢ you can get a comprehensive explanation of this type of control—what it can do and how you can use it. Described in this column before, these are very popular high powered, long battery life actuators.

From the Bayou country of Louisiana comes a new and different tone receiver. The Badaco Manufacturing Co., 2801 Penick St., Shreveport, La. markets the 180R receiver and the 180T transmitter. The completely encased receiver (except tubes) is unique in that it employs only two tubes instead of three (One 3A5 and one 1U5) and uses no C battery. Tone range is 100 to 600 cps, with 95 to 100 per cent modulation and it may also be operated from 100 to 1,200 cps with as low as 65 per cent modulation by merely removing one capacitor. The weight of the receiver is but 3.3 oz. and body capacity effects are minimized to the point of being able to hold the receiver in one hand and tune it with a fingernail of the other hand. The 3-1/4 x 4-1/2 x 7 in. hand-held transmitter has but one tuning adjustment and will operate the receiver at a ground range in excess of two miles. A novel feature of

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the transmitter is the Scotchman Plug, which enables you to operate with straight carrier only or with a 100 per cent modulated 400 cycle tone. One last point of interest is that this set does not have to be operated with continuous carrier, thus effecting a saving in transmitter batteries. Receiver sells for $24.95 and the transmitter for $34.95. A multi-channel control box, for up to six audio frequencies, will be available soon.

Photo shows the new Advance SO relay we mentioned last month. This relay which can be adjusted to operate as low as 2 milli-watts sensitivity may be had in 4,000, 6,500 and 10,000 ohm coil resistances. Life expectancy is 250,000 operations at 1.5 amps. Advance Electric and Relay Co., 2435 N. Naomi St., Burbank, Calif. or through your local radio supply house handling Advance relays. All of our tests are not completed on this relay yet, but it sure looks good.

CLUB NEWS

Mr. Jean L. DeNeuflize, 22 Ave. Friedland, Paris 8, France gave us a call recently before embarking for England. RC activity in France is picking up but has been hampered by the cost of equipment and lack of suitable components. Planes are of the simple type, about 5 to 6 ft. span and nothing fancy. He took back several commercial versions of our two-tuber to try to "get in more flying time." Here's a good address to write to for overseas info on RC.

The LARKS (Los Angeles Radio Controllers) really go in for trophies in a big way, 30 in. tall beauties. Here's how the system works, one which could be adapted by any club. Monthly contests are held in single-channel and multi-channel flying. Each month's winner has his name engraved on a plaque and the one winning the greatest number of times during 1955 hits the jackpot on the 30 in. trophy. He also gets a smaller one for each individual win. Webb Hill and Dean Kenny looked like good prospects for the single- and multi-channel honors up to May 1. In the April contest, Dean Kenny took first in multi-channel with his 6 ft. box-type fuselage job powered with a McCoy .29. The receiver was a two-channel tone job operating into Bonner compound escapements and giving simultaneous rudder, elevator and engine control. Quite a neat trick. Even with a strong gusty wind, he was able to pick up points on photo take-offs, Cuban 8's and inverted flight. Vic Nelson, of Deltron receiver fame, took first in the single-channel event with his box fuselage job. The Deltron receiver fed a Bonner compound with kick elevator and engine control.

The Flying Maniacs of East Park, N. Y. put on a demonstration for a Cub Scout pack meeting headed by Bob Disbrow, who really did a job with his Super Rudderbug. Nothing unusual about this? Well, hardly, except that it was done in a pouring rain and flying out of a football field. Excellent control was had at all times with an Aristol transmitter set on the ground and a piece of cardboard pulled down over the antenna to protect the box from the rain.

Giving RC demonstrations for various organizations and towing advertising banners can add prestige to your club or individual flying. As we remember, about five years ago, Bob Colegrove of Columbus, Ohio brought in a tidy sum to his club's treasury by doing advertising flying.

From the San Diego area comes a modified Sailplane by E. J. Brown and Wes Etteridge. This job will be used to attempt to bring an endurance record to the U.S.A. Besides the two fuel tanks shown, two extra 8 oz. tanks are carried on each side of the pylon for a total of 50 oz. The Arden .19 has flown the ship with a reduced fuel load. However, a Torp or Fox .19 or .25 will be used for full fuel loads. The RC equipment and batteries are carried in the stretched out nose in order to balance the ship. The receiver is an RK-61 transitor unit which will hold all adjustments for over five hours of continual use. E. J. Brown, 4586 Shirley Ann Place, San Diego, Calif. also reports that cliff soaring is a fascinating phase of RC flying. Having lost altitude because of a rough engine, his plane suddenly went up 200 to 300 ft. when it got over the edge of the cliff. You can't do this type of flying in Kansas, but any place where you have hills or a small cliff with the prevailing winds coming in toward them, you can try this type of flying for added thrills. One thing that Brownie has mentioned regarding FAI records is the high financial cost of such an attempt. This is not meant to scare anyone, but rather to give you the true picture before you get all set and then face possible disappointment.

There is a $35 fee for the sanction and paper work, notary fees, photos and three-view drawings. It is suggested that unless you can foot the bill yourself, you interest your club in the idea, as a joint project.

Quite a novel idea by Citizen-Ship Radio Corp. is the precision pattern for the AMA Radio Control Flight Event, printed on Quick-Stick label stock. This can be applied directly to your hand-held transmitter or inside your tool box lid, for quick reference. Contact your local dealer as to obtaining this sticker.

R. J. Beckman, 302 Whitman Rd., Concord, Calif. has been doing some very fine flying with the type of plane shown in photo. The radio equipment is either a five- or seven-channel reed receiver of his own design. It is a little different from the standard reed receiver and control at a quarter of a mile has been attained with a sub-miniature hand-held transmitter with a 3 in. stub for an antenna. Note the low dihedral angle which makes for good maneuverability.

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SUPERMARINE: Ducted fan job for .09.

☐ THE SPACER: Class AB free flight.
STUMPY: .09 combat U-control.

☐ THE CHAMP: Profile free flight .049.
THE TWELVE: .29 - .35 stunter.

☐ MAYBE: .09 sport free flight.
SCRAMBLER: .29 team racer.

☐ WIMPY: .049 scale free flight.
HIGGINS CABIN CRUISER: .09 - .19 boat.

☐ HI BOY!: Palmer stunt .29.
HALF-A DELTA: Free flight delta.

☐ SNIPE: Half-A stunt.
STRATOHAWK: Limited rubber.

☐ SMARTIE: .29 - .35 stunt bipe.
PENNY: Outboard boat.
LI'L SPEED MERCHANT: .049 speed.

☐ SHOEHORN: .049 flying boat.
ALKIE IV: .049 free flight.
QUICK 60: CD speed.

☐ APACHE: .049 free flight.
FABULOUS HAWKS: .14 - .29 scale.

☐ SHEIK: .29 team racer.
DRIFTWOOD: .049 free flight.

☐ FOXY: Aldrich .29 combat.
BIG TIME: Large towliner.

☐ SPOOKY: .09 stunter.
SLOWPOKE: .09 sport free flight.

☐ EL DIABLO: .19-.35 stunter.
TRI-PACER: Scale ukie Piper.
PLAY PLANE: All-balsa FF, .049.

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SIDEWINDER: .049 profile ukie.

☐ GYRATOR: .29 - .35 stunter.
AERONUT: .19 free flight.

☐ BOUNDER: Record .29 speed.
ZEPHYR: .049 free flight.

☐ NOBLER: Aldrich .29 stunt.
FUNSTER: Hot .049 free flight.

☐ SKY WING: .049 flying wing.
CHALLENGER: .29 team racer.

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Contest Calendar

JULY

2 & 3—*Houston, Tex.:* Class AAA Houston International Air Show for FFG, CLS, CLC, CL, PL. Robert R. Osburn, C.D., 902 17th Ave. N., Texas City, Tex.

2 & 3—*Amarillo, Tex.:* Class AAA Globe News 3rd Annual Model Airplane Meet for FFG, CL, OHLG, RC, TR, CLS, CLC, CLFS. James F. Pierce, C.D., 2607 W. 22nd, Amarillo, Tex.

3—*Chicago:* Class AA 3rd Annual Chicago Prop Nutz Flying Meet for FFG, OHLG, TLG, OR. Peter J. Sotich, C.D., 3851 W. 62nd Pl., Chicago 29.

2 & 3—*New Orleans, La.:* Class AAA 14th Annual Gulf States Meet for FFG, CLS, RC, CLC, CLFS. Paul A. Burvant, C.D., 77 Spanish Ft. Blvd., New Orleans 24, La. Pending.

2 & 3—*Tulsa, Okla.:* Class AAA Tulsa Glue Dobbers' 6th Annual Free Flight Contest for PL, FFG, OHLG, TLG, RC, OR, FFFS. Willard H. Kehr, C.D., 4940 N. Johnstown, Tulsa, Okla.

3—*Lancaster, O.:* Class AA Lancaster Skylarks Club Meet for CL, CLC, CLS. Paul McGrew, C.D., 331 E. Main St., Lancaster, O.

3—*So. Weymouth, Mass.:* Class AAA Yankee Championships for PL, CC, OR, TLG, FFG, RC, NC, CL, CLC, CLS, CLFS, beauty, IHLG, IR. Edward G. Dolby, C.D., 25 Exchange St., Rockland, Mass.

10—*Joliet, Ill.:* Exchange Club of Joliet Flying Circus. Glenn F. Stearman, C.D., 604 Abe St., Joliet, Ill. Pending.

10—*Pittsfield, Mass.:* Class AA 4th Annual Berkshire Model Plane Contest for CLS, CLC, TR. Robert L. Elliott, C.D., 48 Curtis Terr., Pittsfield, Mass.

10—*Long Island, N. Y.:* Class AAA Gas Monkeys' 8th Annual Long Island Championships for FFG, Jetex, OR, RC. Edwin W. Howe, C.D., 5 Camdike St., Valley Stream, N. Y.

10—*Orangeburg, S. C.:* Class AAA 1st Palmetto Regional Championships for FFG, CL, TLG, OHLG, CLS, CLFS, RC. Larry Bly, Jr., C.D., P. O. Box 744, Orangeburg, S. C.

10—*Evansville, Ind.:* Evansville Model Airplane Club Meet for CL, CLS, CLFS, CLC, NC. Jerry Knowles, C.D., 1111 W. Delaware, Evansville, Ind. Pending.

10—*Buffalo, N. Y.:* Buffalo Exchange Club Meet. Pending.

10—*Cincinnati, O.:* Class AA Controlliners' Contest for CLS, CLC, CLFS, CL. John M. Kaeser, C.D., 6897 Kenwood Rd., Cincinnati 27, O.

10—*Lansdale, Pa.:* Class AA 2nd Annual Model Airplane Contest for FFG, TR, CLC, CLS, RC. Eva C. Biddle & Harry Hallman, C.D.'s, P. O. Box 85, Neshaminy, Pa.

10 & 17—*Cleveland, O.:* Class AAA 17th Annual Junior Air Races for Jetex, TLG, OR, FFG, RC, PL, CL, NC, CLC, CLFS, CLS, CL. Charles Tracy, C.D., Aviation Editor, The Cleveland Press, Cleveland 14, O.

11-16—*Travis AFB, Calif.:* Air Force World Wide Championship Contest for Air Force personnel.

17—*Hartford, Conn.:* Class AA Insurance City Team Racing Meet. Charles J. Gallagher, C.D., 47 Church St., E. Hartford, Conn.

17—*Kohler, Wis.:* Class AA Annual Free Flight Meet for FFG, OHLG, TLG, FFFS, RC. Wilbur A. Lea, C.D., 1030 N. 14th, Sheboygan, Wis.

17—*West Palm Beach, Fla.:* Class AAA Palm Beach Model Air Show for competitive controlline shows (experimental). John C. Temple, C.D., 510 Clematis St., West Palm Beach, Fla.

18-24—*Los Alamitos, Calif.:* Class AAAA National Championship Model Airplane Contest.

24—*Milwaukee, Wis.:* Class AA Milwaukee Flying Electrons' 4th Annual Flyspiel Meet for RC. Victor R. Weissbrodt, C.D., 2100 E. Webster Pl., Milwaukee, Wis.

24—*Norwood, Mass.:* Class AA Norwood Society of Model Engineers' Meet for CLC, CLS, CLFS. Albert L. Trefethen, C.D., 163 Oakdale Ave., Dedham, Mass.

24—*Ann Arbor, Mich.:* Al Temple, C.D., 9971 Doris, Livonia, Mich. Pending.

24—*Washington, D. C.:* Radio Control Meet. For information, contact Herb Honecker, 8105 Tahona Dr., Silver Spring, Md. Pending.

24—*Fond du Lac, Wis.:* Class AA 1st Annual Fox River Valley Meet for CL, CLS, CLC. B. A. Zuehlke, C.D., 385 E. 18th St., Fond du Lac, Wis. Pending.

30 & 31—*Bristol, Pa.:* Class AA Eastern States Hydro Championships for RC, CLS, NC (all rise-off or over water). Albert E. Abrams, Jr., C.D., 1031 Pond St., Bristol, Pa.

31—*Spartanburg, S. C.:* Class AA 7th All-Dixie Championships for CL, CLS, CLC, CLFS, FFG, RC, OHLG, TLG. C. Hill Hutchins, C.D., Box 403, Spartanburg, S. C.

31—*Ann Arbor, Mich.:* Al Temple, C.D., 9971 Doris, Livonia, Mich. Pending.

31—*Lake Worth, Fla.:* Class AA Cloud Busters' Midsummer Meet for FFG, rat racing and RC. Fred T. Kerr, Jr., C.D., 3628 So. Dixie Hwy., West Palm Beach, Fla.

AUGUST

6 & 7—*San Antonio, Tex.:* Class AAA Alamo Regional Contest for FFG, CL, CLC, CLS, RC. C. C. Perkins, C.D., 235 W. Drexel, San Antonio 10, Tex.

7—*DeKalb, Ill.:* Class AAA DeKalb Cloud Dusters Flying Circus for FFG, OR, RC. Dutch Hess & Dale Hindenburg, C.D.'s, 137½ E. Lincoln, DeKalb, Ill.

7—*Frederick, Md.:* Class AA Exchange Club of Frederick 2nd Annual Model Airplane Contest for FFG, CL, CLS, CLC, TR, CLFS, RC. Everett E. Champlin, C.D., 1002 Rosemont Ave., Frederick, Md.

7—*Boston, Mass.:* Class AA Aero Club Meet for OR, FFG, OHLG. Edward G. Dolby, C.D., 25 Exchange St., Rockland, Mass.

7—*Wallingford, Conn.:* Class AA Meriden Model Maniacs' U-Control Meet for CL, CLC. Chester A. Orrill, Jr., C.D., 47 Carpenter Ave., Meriden, Conn.

7—*Staten Island, N. Y.:* Class AA 5th Annual Metropolitan Championships for RC, FFG. Sal Cannizzo, C.D., 293 Maryland Ave., Staten Island 5, N. Y.

14—*Arcadia, Calif.:* Class AA Team Racing Contest. Similar contests also on Oct. 9, Dec. 11. Les McBrayer, C.D., 1238½ So. 2nd St., Alhambra, Calif.

14—*Alliance, O.:* Class AA Alliance Exchange Club Model Contest for FFG, CLS, CLFS. Edward Cross, C.D., 23 E. State St., Alliance, O.

14—*Beverley, Mass.:* Class AA New England Radio Control Championships. John K. Ross, C.D., 23 Lantern Lane, Wellesley Hills, Mass.

14—*Indianapolis:* Class AAA 9th Annual Mid-Western States Model Airplane Championships for FFG, OR, RC, CL, CLS, CLFS, CLC. Roland C. Rhein, C.D., Allison Div., General Motors Corp., Indianapolis.

14—*Haddonfield, N. J.:* Class AA 2nd Annual Hi-Way Glo Bugs' Team Race Meet. George Moir, C.D., Main St., Mantua, N. J.

20 & 21—*Winston-Salem,* N. C.: Class AA Winston-Salem 6th Annual Free Flight Meet for FFG, OR, TLG, OHLG, FFFS,

RC. Lloyd B. Hathaway, C.D., City Recreation Dept., City Hall, Winston-Salem, N. C. Pending.

21—*Detroit, Mich.:* Class AA 9th Annual Model Plane Contest for CL, CLS, CLFS (and possibly TR and/or NC). Warren E. Bartlett, C.D., 14515 Asbury Park, Detroit 27, Mich.

21—*Manitowoc, Wis.:* Class AA 2nd Annual Air Pirates' Contest for CLS, CLC, CLFS, CL. Wilbur A. Lea, C.D., 1030 N. 14th, Sheboygan, Wis.

21—*Plainview, N. Y.:* Class AAA 9th Annual Screamin' Demons of Long Island, Inc., Long Island Invitational Championships for FFG, OHLG, PL, RC, OR, TLG. L. C. Walker, C.D., 17 Brookdale Dr., Bay Shore, N. Y.

21—*Kokomo, Ind.:* Class AAA North Central Indiana Championships for CL, CLC, CLFS, CLS. Joseph C. Braun, C.D., 106 E. Gano St., Kokomo, Ind.

21—*Danville, Ill.:* Illinois Junior Chamber of Commerce State Championship Air Meet for FFG, FFFS, RC, TR, CLFS, CLC, CLS, CL, NC. Dick Grack, C.D., 17 W. Main St., Danville, Ill. Pending.

28—*Grand Junction,* Colo.: Class AA Exchange Club Annual Contest for CLC, CLS, CLFS. Ralph D. Mulford, C.D., 379 S. Redland Rd., Grand Junction, Colo.

28—*Los Angeles, Calif.:* Class AA 6th Annual Free Flight Scale Contest. Robert E. Moncrieff, C.D., 2108 Santa Fe Ave., Torrance, Calif.

28—*Marion, Ill.:* Class AA Marion Lions Club 12th Model Plane Contest for FFG, TLG, OR, RC, CL, CLS, CLC. Edward H. Aikman, C.D., 1020 N. Market St., Marion, Ill.

KEY TO LISTING OF EVENTS: FFG—Free Flight Gas; CL—Controlline Speed; OR—Outdoor Rubber; TLG—Towline Glider; IR—Indoor Rubber; OHLG—Outdoor Hand-Launched Glider; IHLG—Indoor Hand-Launched Glider; CLS—Controlline Precision (Stunt); CLFS—Controlline Flying Scale; RC—Radio Control; TR—Team Racing; FFFS—Free Flight Flying Scale; PL—PAA-Load; CC—PAA Clipper Cargo; NC—Navy Carrier.

Contests designated "Pending" mean the application is before the proper authorities as we go to press; "Record Trials" mean no prizes, but a chance at cracking the records; "Class A" is a meet with restricted entry; "Class AA" is a meet with unrestricted entry; "Class AAA" is a state-wide or regional meet; "Class AAAA" is a national or international meet.

Engine Review

(*Continued from page 20*)

comparison with a ringed .29 of the same type, the newly lapped engine has a little more steam from 9,000 to 12,000 rpm and is steadier at the lower speeds.

In conclusion, these engines are worthy additions to the range, and while not radically new, will fill a specialized need for many people.

The new .049 glow and Diesel engines embody almost every modern development toward increasing Half-A performance. However, the most intriguing and surprising feature is the incorporation of a spring-loaded square aluminum plunger in the conventional front rotary intake passage. This plunger seals under spring pressure against the inside end of a bell-mouthed aluminum intake extension which is itself retained by the pressed-in spraybar.

The principle behind the arrangement seems to be to have a very large front rotary crankshaft passage and port with a correspondingly large intake, and timing which is absolute maximum for high speed performance, then to neutralize the starting and low speed disadvantages of such a set-up by using a clack

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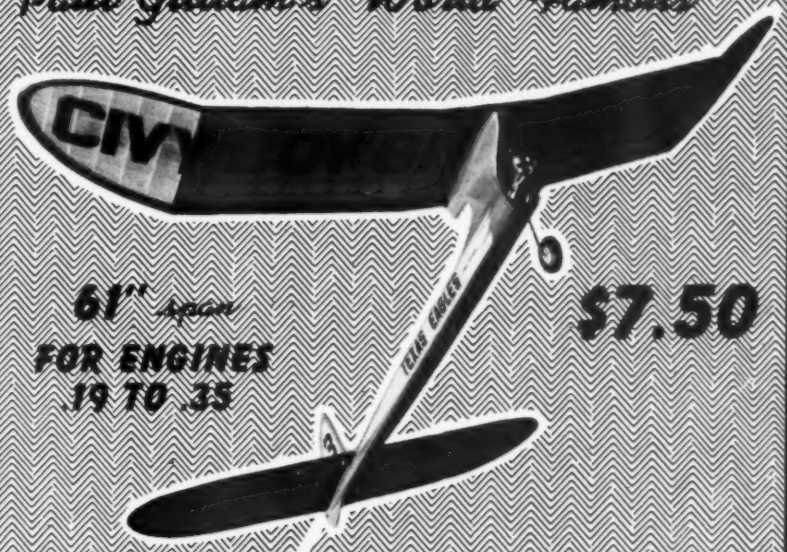

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ADVT. INDEX, AUGUST 1955

Ace Products 42
American Telasco 45
America's Hobby Center 4, 5
Babcock Radio Engineering 32
Badaco Mfg. Co. 42
Berkeley Models 55, 56
Bonner Specialties 49
Breault 42
C. G. Electronics 36
Carter Craft Models 42
Cheminol Corp. 1
Comet Model Hobby Craft 49
Crafts & Hobbies 49, 53
DeBolt Model Engineering 8
Deltron Company 44
Dynamic Products 6
Ectron Products 47
Electronic Specialty Supply 41
E. R. S. 54
Forster Brothers 48
Fox Mfg. Co. 42
Francisco Laboratories 51
Gull Model Airplane Co. 6
Henry Engineering 39
Herkimer Tool & Model Works 3
Hoffman Products 38
Holland Engineering 48
K & B Allyn Co. ..... 3rd Cover
Koding Specialty Co. 48
Kenhi Model Products 53
MC Mfg. & Sales 54
McCoy Products ..... 4th Cover
Minnesota Engine Works 53
Model Aircraft Co. 48
Model Trains 33
Monogram Models 37, 43, 44
Ohlsson Mfg. 41
Pactra Chemical Co. 39
Pittman Electrical Developments 38
Radiomodels 33
Scalemaster 38
Scientific Mfg. 34, 35
Sig Mfg. 48
Spitfire Products 31
Sterling Models 47
Testor Chemical Co. 28, 29
Top Flite Models ..... 45, 2nd Cover
Wilshire Model Center 51
World Engines 40

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valve. It is probable that blowback allied with spring pressure makes the clack valve do the work of sealing the crankcase up to speeds where the rotary valve becomes efficient, after which the absence of blowback and the inertia of the valve result in its staying almost totally open and giving the least possible resistance to the incoming charge. The valve spring-loading is probably arranged accordingly. The square planview of the valve is necessary so that the corners of the square locate the valve in the intake bore, while the sides provide the air passage.

In view of the maximum gas passage cross-sectional area available from an arrangement of this kind, one is inclined to be a little dubious as to the volumetric efficiency values and resulting bhp available at high speeds, as it is a fundamental rule for power to have enormous ports, etc., and McCoy racing engines are perfect illustrations of this maxim; but results count, and the first tankful of fuel makes one's doubts seem pretty silly.

Another question which comes immediately to mind is that of the relative merits of this system in comparison with a straight reed valve. The normal reed has to have enough inherent spring tension to close without appreciable lag at all speeds throughout the range of the engine, in which job it is, of course, assisted by crankcase pressure. However, a fair amount of pressure is required to overcome this spring in the course of opening the valve. This reduces the volumetric efficiency and while reed valves definitely do give an engine higher performance than the normal rotary valve—which is a compromise as regards timing in order to permit reasonable efficiency over a fair speed range—a mechanical valve arranged for absolute ultimate speed exclusively can be expected to surpass the reed valve at this one speed, but be hopeless at the lower end. Therefore, if a rotary valve with red hot timing can be blanked off by a reed valve at low speeds and an arrangement provided whereby the reed can be completely removed at high speeds, then we should have the ultimate in versatility. This seems to be the goal toward which McCoy is heading and they have gone a long way toward attaining it. So the long, long trail unwinds a little farther, and we can expect to see considerable development of this idea which should eventually result in engines which, from the induction point of view, are truly general purpose engines. Then, no doubt, attention will focus on methods of regulating the bypass and exhaust timing.

To return to the particular engine under discussion, both Diesel and glow versions have many novel features other than their valve mechanism, but most notable is that, while almost identical in external appearance, they are completely different internally. Both have pressure die-cast aluminum crankcases, the glow version being polished and the Diesel, matt gray. The glow is unbushed; the Diesel has a bronze insert main bearing. The glow's intake is large; the Diesel's, small.

The crankshafts are entirely different, the glow type being relieved forward of the very large port to within 3/16 of the end and having a large gas passage. The Diesel shaft is not relieved and has a smaller gas passage and elliptical port. The glow shaft is case hardened and has a small diameter crankpin, whereas the Diesel shaft is not hardened and has a larger crankpin and counterweight to suit.

Conrods are completely different with a light shank and ball and snap ring piston connection on the glow, and a massive shank and bronze wrist pin on the Diesel. Pistons are correspondingly light on the glow and heavy on the Diesel with a considerably shorter skirt on the latter which uses full sub-piston induction to supplement the small intake.

The cylinders employ different methods of transferring the charge from the crankcase, with two internal grooves and twin opposed exhaust ports of considerable height on the glow, and three narrow exhausts with three external bypass ports beneath them on the Diesel. The Diesel has twice the number of threads retaining the cylinder in the crankcase and about four times as many for retaining the head. The glow's piston crown is almost flat, whereas the Diesel's is conical. A most interesting detail is the difference in port belt flange gasketing, the glow employing copper and the Diesel, an asbestos compound.

We have never seen a better illustration of the difference in stressing requirements for the two types of ignition, nor a better appreciation of porting requirements for getting the most out of their respective operating advantages. A combined head and plug element is used on the glow version, which is retained by the finned portion, and appropriate flats and a wrench are provided for replacement.

The Diesel contra piston is an excellent fit making the plastic O-ring an almost unnecessary additional safeguard. Instead of the usual fiber insert for compression screw friction, a clever device employing a small coil spring engaging with the thread is used, and to those who love to see what is inside, we suggest that unless you have superb control over your temper, do not remove this spring because it is a major operation to refit.

Small rear-mounted die-cast fuel tanks with twin vertical vents are provided on both types, with a center retaining screw. Power transmission is by means of a splined shaft and aluminum prop driver, steel washer and nut, with a long sensible thread on the shaft. The jet needles are spring-tensioned with a knurled head and the spraybars are press fitted.

The complete power pack is presented in a formed transparent plastic display bubble which is hermetically sealed and contains a plate for adapting the beam mounts to radial mounting, a wrench, fuel tubing, parts list, instructions and decal.

Now for operation and handling. The clack valve really pays off in the starting department for, like an automatic transmission, it takes the fun out of life. Nobody should have the slightest difficulty in starting the glow version, hot or cold, by merely choking. An exhaust prime, although recommended by the makers, is not really necessary. With experience you'll find the Diesel is, if anything, even more anxious to start and the compression setting does not seem to be critical. Where experience is lacking, a step-by-step adherence to the excellent starting instructions has to produce results. It is doubtful if there is any more easily starting Diesel design in existence.

Efficiency under various loads is brought out in the test results which are similar to those of a straight reed valve engine and the comparison between the two engines makes further comment unnecessary.

TEST: McCoy .29, .36, .049
Diesel and Glow

Fuel: (Diesel) McCoy Diesel Fuel; (Glow) Supersonic 1000; Running Time Prior to Test: (Diesel) 1 hour; (Glow) 3/4 hour; Bore: .405; Stroke: .386; Weight: (Diesel) 1-3/4 oz.; (Glow) 1-1/2 oz.

Power Prop	*Diesel rpm*	*Glow rpm*
6 x 5	11,200	10,500
6 x 4	12,400	11,750
6 x 3	14,700	14,250
5-1/4 x 5	13,750	13,000
5-1/4 x 4	14,250	14,500
5-1/4 x 3	14,800	17,000
Top Flite		
66 x 5	10,250	9,600
6 x 4	11,600	11,000
6 x 3	13,750	13,000

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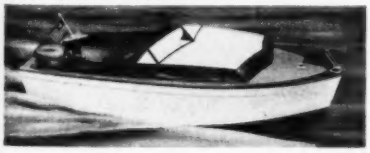

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For Gas or Electric Outboards or Inboards — 18" Long

Easy to build! Mahogany Veneer Planking, Deck Hardware.

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A well designed high performance sailboat, controlled by a mechanical automatic pilot, which can make the boat "come-about" and return to shore.

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- Ready to Use Plastic Sails
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Berkeley's **"SAILFISH"**

1½" = 1' Scale 18" Long

- Plastic Sail • Full Size Plans • Pre-fabricated

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Gas or Electric Outboards — 16" Long

Formed Vinyl Hull and Foredeck, Deck Hardware, Cement

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For .09 to .35 Engines — 28" Length

Mahogany Veneer Planked. Plans Include Radio Control Details

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R.C. FLYING SCALE

For Radio Control — Free-Flight — PAA-Load

"PIPER CUB J-3"

For .15 to .25 Engines—71" Span—2" Scale

Weight: 4½ lbs. — 700 Sq. In. Wing Area — 14.2 oz. Loading

The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it's a natural for R.C. or Free-Flight flying. The six foot span permits the extra R.C. installation that you dream about. This is a rugged, detailed, flight proven design. Full-Size Plan with R.C. installations, Authentic Decals, etc.

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CESSNA "170"

For Radio Control — Free-Flight — PAA-Load

For .25 to .35 Engines — 72" Span — 2" Scale

Controlling your "Cessna 170" by Radio is a thrill you will not forget! Perfect in scale, rugged, stable in all attitudes, yet responsive in control, with good wind penetration qualities. The gear location is ideal for extended take-off runs. The larger than average size makes it easier to control in windy weather.

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Radio Control – Free-Flight – Controline

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This perfect scale R.C. design may be built as a Free-Flight or Controline version if desired. Full Size Plans cover special details for all three versions. Flaps, elevator, rudder, motor and nose gear may be operated by R.C. Ailerons for trim, cabin door access to Radio. Highly Pre-fabricated, Authentic Decals.

1½" = 1' Scale—44" Wingspan

.065 to .099 Engines—Radio Control

.035 to .075 Engines—Free-Flight

.075 to .15 Engines—Controline

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• Formed Metal Ring Cowl

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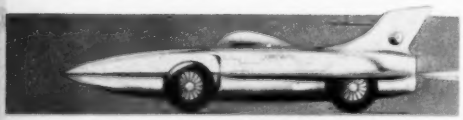
1" = 1' Scale 48" Wingspan

.049 to .075 Engines—Radio Control

.035 to .075 Engines—Free-Flight

.074 to .15 Engines—Controline



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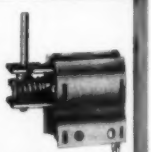

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For superior to any other electric motor. Available in Direct Drive, and in four ratios of reduction drive. Suitable for Boats, Cars, Radio Control Servos, Model Railroad Accessories, etc. Will run well on only one pencell (1½ volts) if desired.

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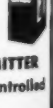

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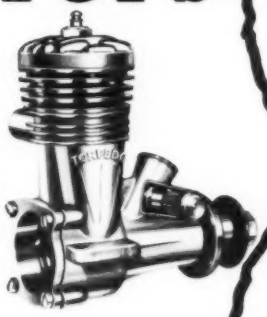

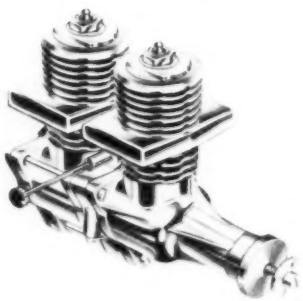

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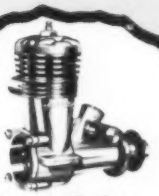
Here is the ultimate in twin engines at a price within reach of all. Both are built with the same rugged construction and mechanical fitness of the famous Sky Fury .049. The Sky Fury TWINS streamlines your plane, too, offering less frontal area than a single engine of comparable size.



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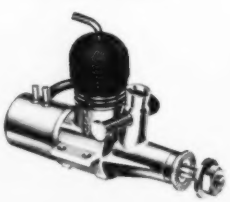

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